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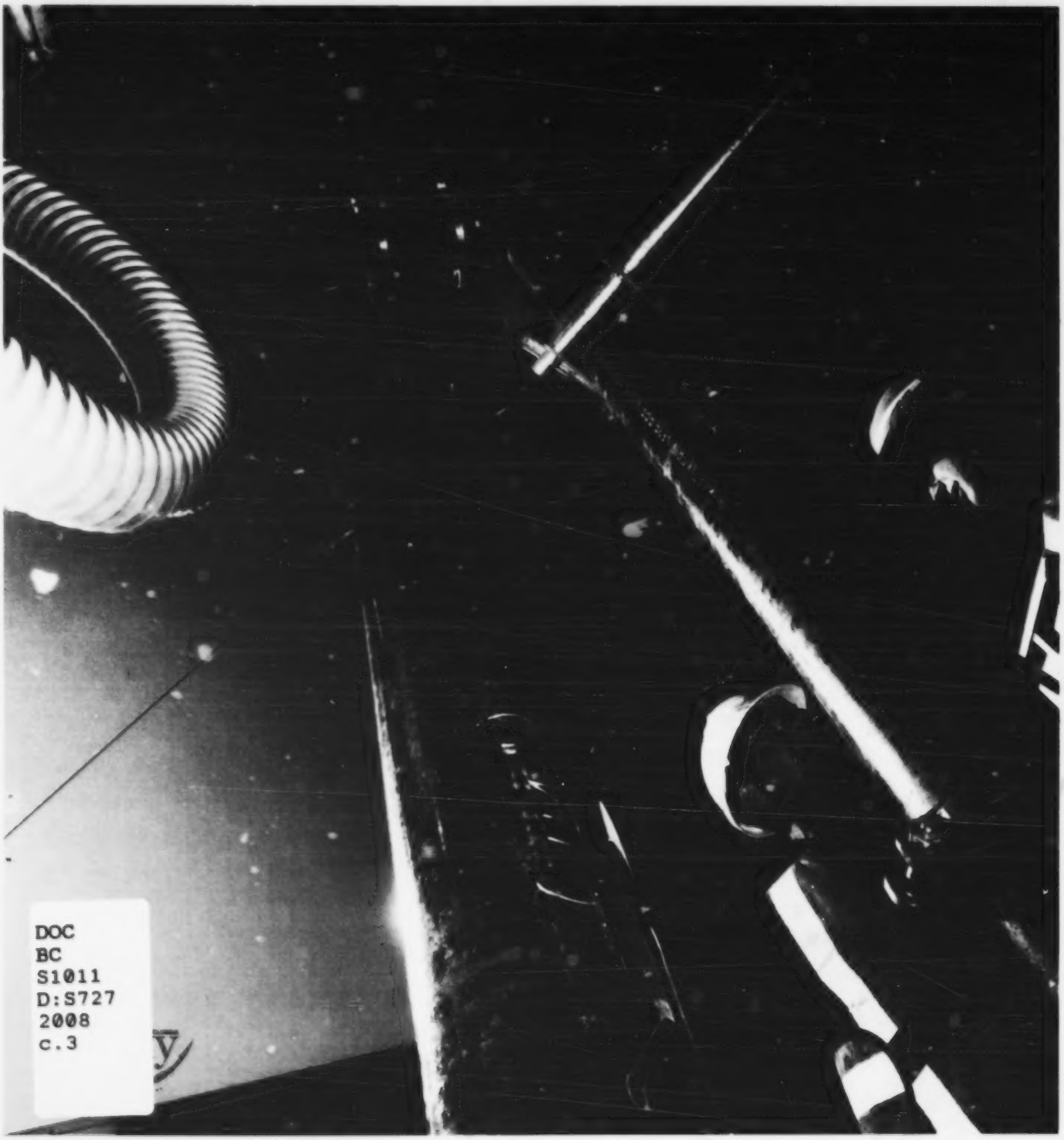
BRITISH COLUMBIA SAFETY AUTHORITY

STATE OF SAFETY REPORT 2008



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WHO WE ARE

The British Columbia Safety Authority is an independent, self-funded corporation that inspires safety excellence in British Columbia by working with business, industry and the general public to enhance the safety of technical systems, products, equipment and work. We are a not-for-profit organization incorporated through the *Safety Authority Act*. We administer the *Safety Standards Act* and portions of the *Railway Safety Act*, and the power to do so is delegated by Administrative Agreements with the Province of British Columbia.

We deliver safety services that apply to work and products, and we oversee the safety of the following industry sectors in the province:

Amusement rides

Boilers, pressure vessels and refrigeration

Electrical equipment and systems

Elevating devices, such as elevators and escalators

Gas appliances and systems, including hydrogen

Passenger ropeways, such as aerial trams and ski lifts

Railways, including rapid transit

Our prime assets are our knowledgeable and experienced employees, who have a collective passion for safety.

In order to prevent accidents, our services include:

- Educating the public about safety issues as well as certifying individuals and licensing contractors
- Supporting clients in the development of equivalent standards agreements, and auditing their safety management plans
- Inspecting technical work and equipment, including collecting information through incident investigation and registering new equipment and designs
- Conducting research, including contributing to provincial and national code development and updating regulations for each industry sector we oversee
- Enforcement, including ensuring that there is a level playing field in being a part of the safety system of BC.

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MESSAGES

MESSAGE FROM THE CHAIR

While the BC Safety Authority's annual *State of Safety Report* is a requirement of our Administrative Agreement with the Province of British Columbia, it is also an essential component of our commitment to openness and accountability.

In this report, we share information about safety incidents that occurred in 2008 in each of the technology areas we oversee. This includes a summary of the total number of incidents reported to us during the year, as well as an overview of the results of inspection activities and a discussion of current initiatives to improve safety.

Sharing safety incident data is part of good governance practice as it enables the public and industry stakeholders to gain insight into safety trends. We believe that sharing safety incident data creates an environment and culture where safe behaviours are encouraged and expected, province-wide. Knowing where and why incidents occurred, we can take steps to prevent similar incidents from occurring in the future by launching educational campaigns or implementing effective enforcement strategies. Sharing information about incidents also enables us to work with industry to identify safety trends and take action to minimize hazards.

On behalf of the Board, I would like to thank the BC Safety Authority staff and our stakeholders for their continued dedication to making BC a leader in public safety. It is by working together in a spirit of openness and transparency that we will improve the state of safety in BC.

Sincerely,

John Watson, P.Eng.
Chair of the Board

MESSAGES

MESSAGE FROM THE PRESIDENT AND CHIEF EXECUTIVE OFFICER

This *State of Safety Report* summarizes all our safety data from 2008, and outlines the findings of our safety officers who are out in the field each day – consulting with clients and ensuring the safety of equipment and operations through assessments – as well as the work of many other BC Safety Authority staff who analyze safety trends, suggest changes to reduce hazards, and organize information and education sessions to talk about safety concerns.

In 2008, our safety officers continued their focus on inspecting high-risk areas. To take just one example, we issued more than 65,000 electrical installation permits in 2008, and then conducted follow-up inspections of close to 41,000 of these permits that were considered higher risk. In the gas technology area, our safety officers gave priority to higher-risk installations and to contractors who had a history of not complying with safety codes and standards.

Education was once again a major initiative in 2008, and this priority is reflected in the activities of our safety officers. In response to the growing number of zipline operations, we worked with members of the amusement ride industry to bring these previously unregistered rides into compliance by educating operators.

Based on our belief that information is the key to safety we also:

- held educational sessions with electrical contractors and apprenticeship institutes to discuss safe electrical work practices;
- facilitated town hall meetings with gas contractors;
- launched a public education campaign to promote safe behaviours on chairlifts;
- initiated the *Can You Dig It?* campaign to gather information and provide education about reducing the number of hits to natural gas lines; and
- presented at a convention of the BC Association of Agricultural Fairs and Exhibitions on licensing and permit requirements for the amusement ride industry.

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MESSAGES

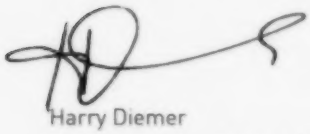
The data collected by our technical experts throughout the province enables us to develop strategies to minimize safety risks. In the gas technology area, for example, carbon monoxide poisoning is an ongoing concern. After conducting a root cause analysis of several incidents in 2008, we proposed changes to the Natural Gas and Propane Installation Code that will improve the safety of propane refrigerators. When developing any strategy, we acknowledge that there are many organizations that administer different safety regulations. We recognize that this creates gaps, as well as overlaps in jurisdiction, which we are managing through memoranda of understanding, joint investigations and by working with other organizations to ensure the delivery of comprehensive safety services without duplication.

Standards harmonization was another area of focus in 2008. We are taking a leadership role in harmonization initiatives that will ultimately improve safety across jurisdictions and borders. In 2008, we participated in discussions to create a single set of North American standards for the amusement ride industry. As part of the Trade, Investment and Labour Mobility Agreement (TILMA), we continued our work to reconcile standards between BC and Alberta for boilers, pressure vessels, piping and pressure welding as well as the training requirements for operating engineers. In addition to making safety analysis and enforcement more effective in the two provinces, TILMA is enabling us to take a leadership position in standardizing those occupations under the *Safety Standards Act* that are subject to both TILMA and the Agreement on Internal Trade.

As you can see, the data we collect throughout the year – and present here in our *State of Safety Report* – is fundamental to our operations. It allows us to identify high-risk areas and create strategies to reduce risk and prevent accidents across our province. Year-over-year safety will improve as we continue to develop tools such as risk control plans, incident investigation skills and root cause analysis to reduce risk and prevent accidents.

I would like to take this opportunity to thank industry stakeholders for their commitment to reporting incidents and working with us to improve public safety. I would also like to thank our staff – they work tirelessly to collect information, share data with colleagues, investigate incidents and educate our clients and stakeholders about the best practices that are making BC a leader in safety.

Sincerely,



Harry Diemer
President & Chief Executive Officer

Safe

ABOUT THIS REPORT

This report is the fifth annual publication on the state of safety for the technologies overseen by the BC Safety Authority. The 2008 *State of Safety Report* provides a summary of the outcomes of inspections carried out by our safety officers as well as an overview of reported incidents between January 1, 2008 and December 31, 2008.

This report summarizes inspection data and identifies safety risks. In addition, it details the number, types and causes of incidents reported in each regulated industry.

It is not the intent of this report to provide detailed information about specific incidents: the analysis of this data is used to develop accident prevention strategies in specific industry sectors. It is intended that this information will provide other organizations, industry and the public with information about safety hazards and trends so that we can act together to prevent accidents and incidents before they occur.

DATA COLLECTION AND ANALYSIS

Our incident reporting system and incident data collection method have been evolving since the BC Safety Authority began operations in April 2004. Revisions and changes to reporting methods have been ongoing as continual improvements were made to the process. In 2004, our inspection and incident data covered only nine months of operation. In 2005, our data collection methods for inspection reports were harmonized across technologies to provide more consistent data. Starting in 2006, we significantly changed the reporting methods to provide much more accurate results and we introduced a new computerized system for incident reporting in 2007.

As different collection methodologies were used, comparisons of inspection data prior to 2005 and incident results from years prior to 2006 are of limited value. Thus, inspection data has been detailed for four years starting in 2005, and incident data has been compared with incident results of 2006 and later.

The data[1] included within this report was obtained from the BC Safety Authority's incident investigation records and safety officer inspection reports for 2008. This report describes the distribution and characteristics of the incidents that occurred in 2008, provides details on the injuries and fatalities in the regulated technologies, and outlines the activities conducted to prevent additional incidents or mitigate the consequences of future incidents. In addition to highlighting safety risks, this report identifies areas where safety can be improved.

[1] The Province of British Columbia has entered into agreements with authorities other than the BC Safety Authority to provide inspection and incident investigation services for specific regions or industries as described below:
- Ten municipalities in British Columbia have agreements to administer portions of the *Safety Standards Act*; eight municipalities administer all aspects of the *Electrical Safety Regulation* and seven municipalities administer the *Gas Safety Regulation* for specific sizes and types of equipment. (See Appendix A for a listing of the municipalities).
- In accordance with an agreement with the Province, incidents for common carrier railways are reported to and investigated by the Transportation Safety Board of Canada.

Inspection and incident investigation data from these authorities has not been included in this report.

OUR TECHNOLOGIES

The BC Safety Authority regulates seven technologies. We assess new and operating equipment, license contractors and issue certificates of qualification to workers. In 2008, we completed close to 67,000 assessments. There were almost 8,000 licensed contractors across all technologies and more than 61,000 individuals with certificates of qualification.

AMUSEMENT RIDES

We are responsible for verifying the safe installation and operation of more than 300 amusement rides in British Columbia, including rides operated by travelling amusement (carnival) companies that move between provinces.

BOILERS, PRESSURE VESSELS AND REFRIGERATION

We oversee the design, construction and operation of steam and hot water boilers, refrigeration units and pressure vessels throughout the province. We license contractors who install and repair this equipment, and certify the power engineers who operate it.

ELECTRICAL

The BC Safety Authority inspects electrical installations at commercial, industrial and residential sites throughout British Columbia, except for those areas where the municipalities provide inspection services. We administer a licensing program for all electrical contractors in the province and certify all Field Safety Representatives[2], authorizing them to accept the responsibility for ensuring that electrical contractors complete their work in accordance with the *Electrical Safety Regulation*.

ESCALATORS AND ELEVATORS

We oversee the safety of passenger elevators, freight elevators, escalators, moving walks, handicapped lifts and construction hoists in the province. Our staff conducts design reviews, field verifications of new installations and periodic inspections of existing units, and we register contractors working on elevating equipment.

NATURAL GAS AND PROPANE

We are responsible for overseeing the safe use of natural gas and propane, and digester, landfill and hydrogen gases at commercial, industrial and residential sites. The BC Safety Authority certifies all gas trade professionals and licenses all contractors in British Columbia. Inspections of installations generally categorized as a residential site[3] are done by some municipalities; we conduct inspections of all other gas equipment in the province.

PASSENGER ROPEWAYS

The BC Safety Authority regulates tramways, gondolas, chairlifts, T-bars and tow ropes across the province. In addition to conducting safety inspections of new and existing units, we also work with industry associations and educational institutions to deliver safety training programs for passenger ropeway operators.

RAILWAYS

Provincially certified railways operating in British Columbia are regulated by the BC Safety Authority through a compliance program consisting of audits and inspections to certify that a railway's operations are being conducted safely. These railways include common carrier railways, industrial railways, heritage railways and commuter railways.

[2] A 'Field Safety Representative' is an individual who holds a certificate of qualification issued under the *Safety Standards General Regulation*.
[3] Not exceeding 14 kPa pressure or a load of 120 KW.

IMPROVING SAFETY

In 2008, the BC Safety Authority shifted its resources to implement the Accident Prevention Model, an accident prevention and service delivery model based on risk control. This model concentrates on four areas or "pillars" to support the safety system: education and outreach, inspection, research and enforcement.

- **Education and Outreach:** To increase the flow of information and knowledge between the BC Safety Authority, the public and industry through awareness campaigns, information sessions, code updates, bulletins, our website and on worksites.
- **Inspection:** To use risk-based inspection services to promote hazard prevention and promote duty holders' responsibility for the risks they create.
- **Research:** To conduct data gathering and analysis, enabling the BC Safety Authority to identify hazards and trends that will help industry to act and prevent incidents before they occur.
- **Enforcement**: To "level the playing field" and increase the accountability of non-compliant contractors.

Implementing the Accident Prevention Model meant that our approach shifted from a reliance on inspection for code conformance as the primary safety tool to a multifaceted safety system designed to systematically reduce hazards, prevent accidents and focus our resources on higher-risk areas.

Overall, the focus for 2008 was promoting safety through education and outreach. There were education initiatives in all technologies, and specific outreach projects in the Amusement Rides and Railways technologies focused on operators who were unaware of or avoided regulatory requirements. However, each technology had specific higher-risk hazards that were mitigated through control plans, and we consequently shifted resources to the pillar best suited to reduce the risk. This shift in resources is partially reflected in the changes in the number of inspections performed year over year.

PROMOTING SAFETY THROUGH EDUCATION

To educate people and change unsafe behaviours, we developed more ways to share, communicate and distribute our knowledge with the public. We tried to guide changes in behaviour by making it easier for people to access information and to improve the way we shared knowledge with the public and industry. We also carried out issue-specific awareness campaigns, information sessions and code update sessions for each of the technologies we regulate. Details of these campaigns are included in this report and can be found in the technology summary sections.

When adopting the Accident Prevention Model, it was recognized that education, backed up by enforcement, was the primary means of changing unsafe or non-compliant behaviour. Though education and enforcement are at opposite ends of a continuum, they work interdependently in the safety system to support behavioural change as a driver towards compliance. The BC Safety Authority's education efforts are complemented by compliance-oriented actions.

In 2009, we will continue with education initiatives but will also increase our focus on enforcement activities to promote public safety.

IMPROVING SAFETY

CHANGING BEHAVIOUR WITH ENFORCEMENT ACTIVITY

Since the *Safety Standards Act* came into effect in 2004, the BC Safety Authority has established policies, procedures and processes for effective enforcement to "level the playing field" and increase the extent to which non-compliant contractors are held accountable. Our goal is to focus enforcement on three key areas: planned, proactive enforcement activities; timeliness; and transparency of information.

Our enforcement strategy will connect enforcement to the research, education and outreach, and inspection pillars of the Accident Prevention Model by identifying high-risk areas through research, then delivering appropriate safety messages through education and inspection activities, and when necessary, ensuring compliance using the enforcement actions legislated by the *Safety Standards Act*. Enforcement actions include suspension of contractors' licences, suspension or revocation of certificates of qualification, and issuing compliance orders, monetary penalties and discipline orders. Effective use of these tools and processes builds greater understanding and awareness among non-compliant contractors, and supports increased levels of voluntary compliance.

The top enforcement tool used by the BC Safety Authority was the Compliance Order. Most of the 286 compliance orders issued in 2008 related to overdue non-compliances identified on Certificates of Inspection or failure to provide proper maintenance and testing records.

There were five monetary penalties issued to contractors in the electrical and gas technologies for failing to take out the proper permits, performing work that was beyond workers' qualifications or scope of the contractors' licence, performing regulated work that was non-compliant and unsafe for use, and performing regulated work without the proper licences or permits in place.

2008 ENFORCEMENT ACTIVITIES BY TECHNOLOGY

	ENFORCEMENT ACTIVITIES*	AMUSEMENT RIDES	BOILERS, PRESSURE VESSELS & REFRIGERATION	ELECTRICAL	ELEVATING DEVICES	GAS	PASSENGER ROPEWAYS	TOTAL
SANCTIONS	Revocation of a Contractor's Licence	0	0	0	0	0	0	0
	Suspension of a Contractor's Licence	0	0	2	0	2	0	4
	Revocation of a Certificate of Qualification	0	0	0	0	1	0	1
	Suspension of a Certificate of Qualification	0	0	0	1	2	0	3
	Suspended Authorization and Permit Privileges	0	0	0	0	1	0	1
	Suspended Permit Privileges	0	0	321	0	4	0	325
Monetary Penalty		0	0	1	0	4	0	5
Compliance Order		0	1	164	29	92	0	286

* Railway statistics have not been included in the figures presented

ENFORCEMENT ACTIVITIES 2006–2008

	ENFORCEMENT ACTIVITIES*	2006	2007	2008
SANCTIONS	Revocation of a Contractor's Licence	1	3	0
	Suspension of a Contractor's Licence	0	0	4
	Revocation of a Certificate of Qualification	1	2	1
	Suspension of a Certificate of Qualification	0	1	3
	Suspended Authorization and Permit Privileges	8	7	1
	Suspended Permit Privileges	489	374	325
Monetary Penalty		1	0	5
Compliance Order		120	173	286

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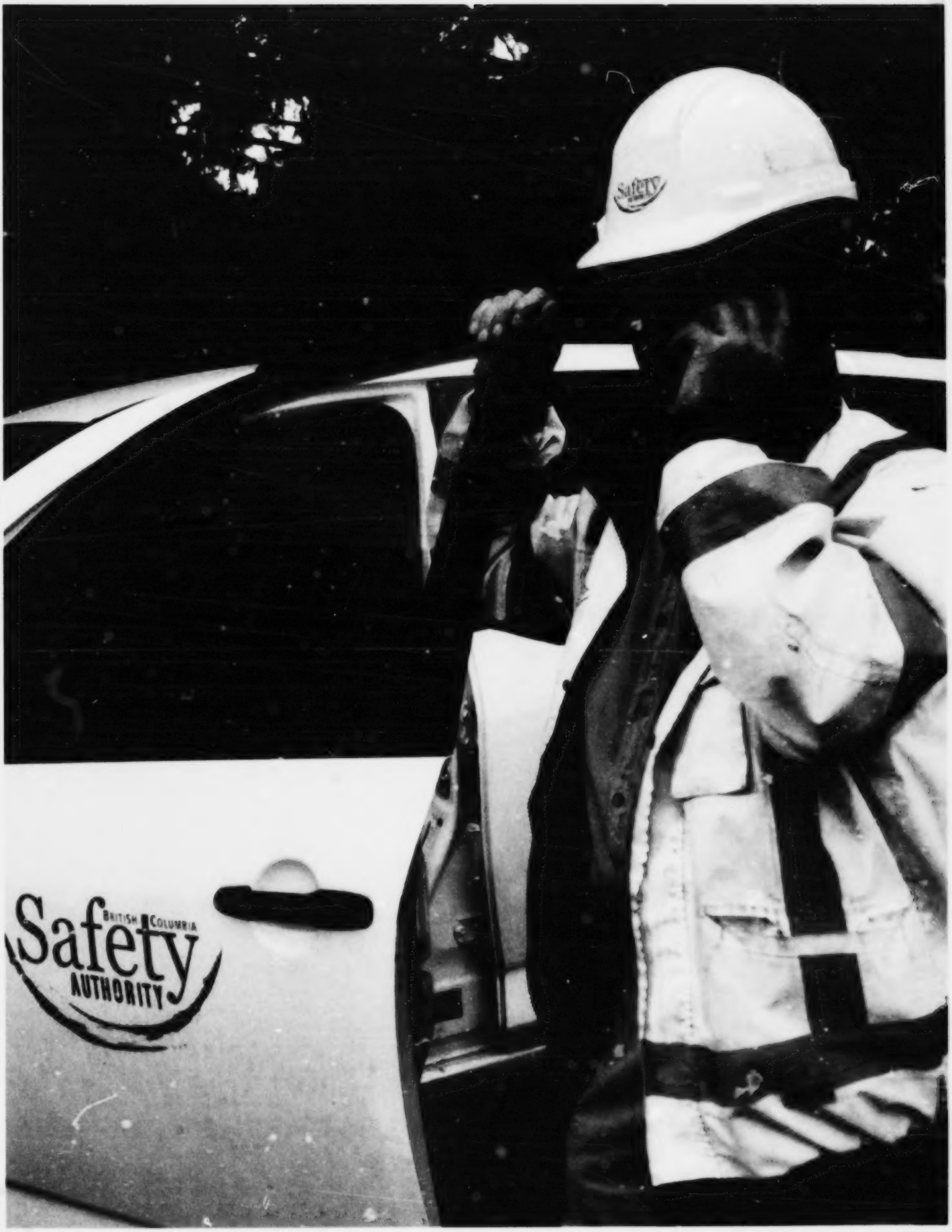
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BRITISH COLUMBIA
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AUTHORITY

INCIDENTS SUMMARY

REPORTED INCIDENTS

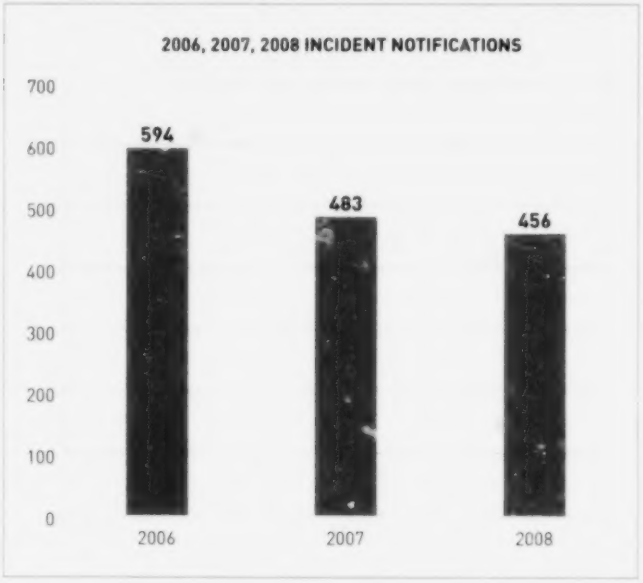
There were 456 incidents reported to the BC Safety Authority in 2008, all of which were followed up on. Our investigations determined that 97 of the 456 reported incidents were not related to either equipment or operations we regulate. Included in those 97 are 72 incidents reported by commuter railways[4].

In 2008, there were 359 reported incidents that were directly related to regulated equipment or operations.

TECHNOLOGY	INCIDENT NOTIFICATIONS RECEIVED BY THE BC SAFETY AUTHORITY	% OF TOTAL NOTIFICATIONS RECEIVED BY THE BC SAFETY AUTHORITY
Amusement Rides	18	4
Boilers, Pressure Vessels and Refrigeration	7	2
Electrical	142	31
Elevating Devices	20	4
Gas	50	11
Passenger Ropeways	108	24
Railways	111	24
TOTAL	456	100

COMPARING 2008 WITH PREVIOUS YEARS

There were 456 incident notifications received in 2008, down 5% from 483 notifications in 2007. This downward trend may not directly reflect increased safety performance. The number of incident notifications received in each technology area partially reflects that industry's focus on safety and dedication to capturing safety statistics for prevention purposes, as well as its knowledge of reporting requirements. A technology with a mature safety management system – dedicated to capturing as much incident information as possible – could report a large number of incidents.



[4] In accordance with federal reporting requirements, commuter railways are required to report all incidents that occur on railway property and not just those incidents directly related to railway operations.

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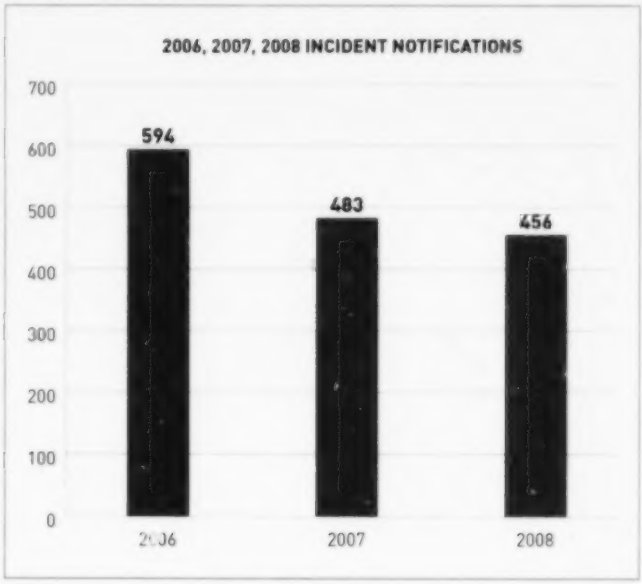

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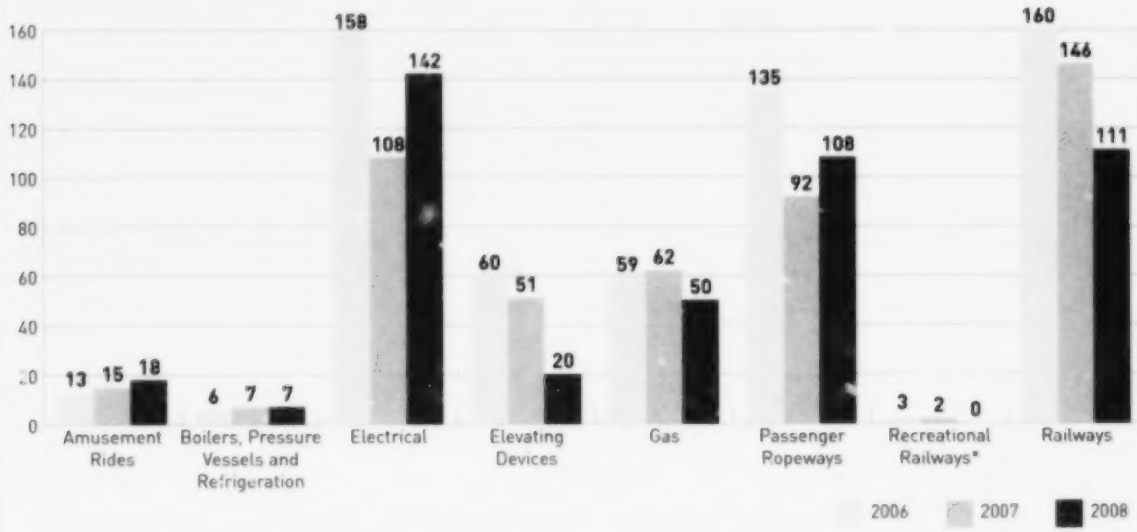
INCIDENTS SUMMARY

As shown in the table of incident notifications by technology, there are noteworthy differences between technologies in terms of the number of notifications reported. A decrease in incident notifications may indicate poorer reporting and not a better safety record. Changes in incident numbers must be analyzed for long-term trends over several years before they can be considered a significant measure of safety system performance.

2006, 2007 AND 2008 INCIDENT NOTIFICATIONS BY TECHNOLOGY



* As of January 1, 2008, the term "recreational railways" is no longer used. See Amusement Rides on page 15 for more information.

FATALITIES AND INJURIES

All incidents reported to the BC Safety Authority were classified and analyzed based on their severity, with the exception of railway incidents. Unlike the other technologies, railways are administered under the *Railway Safety Act*. An agreement between the Province and the Transportation Safety Board of Canada adopts the federal reporting requirements for railways. This means that commuter and industrial railway incidents are reported to the BC Safety Authority, but not classified by severity, as are the other technologies. In accordance with the agreement, incidents occurring on provincially regulated common carrier railways are reported directly to the Transportation Safety Board of Canada and this data has not been made available to the BC Safety Authority.

Injuries are classified by severity, according to whether the following indicators are present:

- long-term impairment of body functions or loss of function
- significant physical pain and some disability
- professional medical attention is required
- any residual effect.

INCIDENTS SUMMARY

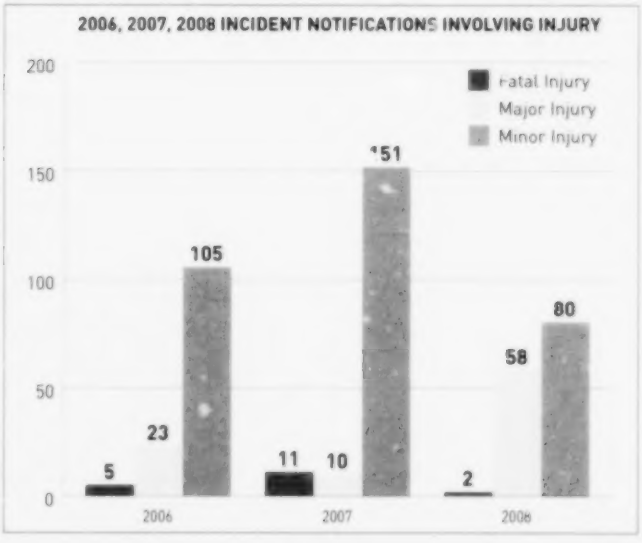
Injuries resulting from incidents are summarized as minor, major or fatal based on their classification. Injuries are not recorded in cases where investigation ruled out regulated equipment as the cause of the incident. This is often the case when electrical safety officers are requested by fire departments to assist in investigations because of their expertise. For example, in 2008, safety officers helped fire departments investigate seven fire-related fatalities; these investigations determined that electrical equipment was not the source of ignition.

In 2008, there were 138 injuries and two fatalities. Of the 138 injuries, 80 (60%) were minor injuries (consisting of lacerations, contusions, abrasions or other similar injuries). All fatalities have a profound emotional impact on all involved. The BC Safety Authority is committed to assisting other authorities in their investigations into the circumstances of a death to prevent future death in similar situations.[1]

SUMMARY OF INJURIES SUSTAINED IN 2008 BY TECHNOLOGY

TECHNOLOGY	TYPE OF INJURY			TOTAL
	MINOR	MAJOR	FATAL[2]	
Amusement Rides	12	1	0	13
Boilers, Pressure Vessels and Refrigeration	3	0	0	3
Electrical	11	4	0	15
Elevating Devices	11	2	0	13
Gas	0	34	2	36
Passenger Ropeways	43	17	0	60
Railways	DATA NOT AVAILABLE			

The total number of minor injuries sustained in incidents in 2008 decreased to 80 from 151 in 2007. While there were decreases in both fatalities and minor injuries, there was a marked increase in major injuries. Much of this increase can be attributed to a single incident in an industrial plant where 27 people reported the symptoms of carbon monoxide poisoning due to an inadequately vented boiler.



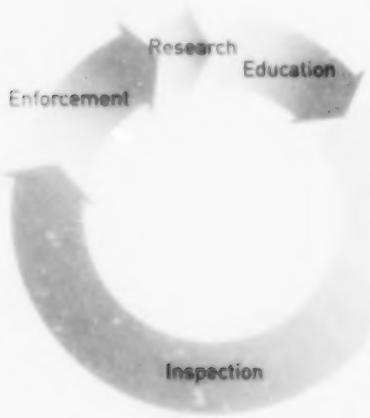
[1] The facts of all sudden or unexpected deaths must be ascertained and clarified by the BC Coroner Service to determine how, when, where and by what means the death occurred.

[2] There were seven fire-related fatalities reported in the electrical technology. In all cases, investigation ruled out electrical equipment as the source of ignition.

AMUSEMENT RIDES

The BC Safety Authority oversees the safety of amusement ride installation and operation in accordance with the *Safety Standards Act* and the *Elevating Devices Safety Regulation*. The types of regulated amusement rides range from small, single flume waterslides in hotels and inflatable play equipment to large major rides such as roller coasters operating at the Pacific National Exhibition. Small train rides such as the Stanley Park Train are also included within the amusement ride technology.

2008 AMUSEMENT RIDES SAFETY PROGRAM ACTIVITY



SUMMARY

In 2008, the program for safety in amusement rides was centered on ensuring this industry was participating in the safety system in British Columbia. The BC Safety Authority's research found that there were many amusement ride operators who were unaware of the regulatory requirements or were actively avoiding these requirements. In order to improve public safety, we deliberately focused the resources of our amusement ride safety officers on these operations.

Of the four pillars of the Accident Prevention Model, we focused on inspecting and assessing these operators. The majority of our resources were spent carrying out research to locate these operators, as well as physical inspections of the equipment and meetings with the operators.

As tourism continues to be a growth sector in BC, despite the economic downturn, there is expected to be ongoing growth in the number of amusement operations in BC, and in particular those that provide a different experience, such as "ziplines". These are typically associated with resorts that operate outdoor experiences. Because these are relatively new devices to tourist industries, they have been operating outside any regulatory infrastructure for some time. There are no existing codes and standards with specific requirements for these devices in North America and therefore the general requirements of the CSA standard for amusement rides were applied. While 2008 was focused on identifying and registering these operations as required by the regulations, in 2009, resources will be shifted into research to assist national code committees to develop better tools, such as codes for industry, to ensure public safety.

G. Paddon

Greg Paddon
Amusement Rides & Passenger Ropeways Safety Manager

INCIDENTS SUMMARY

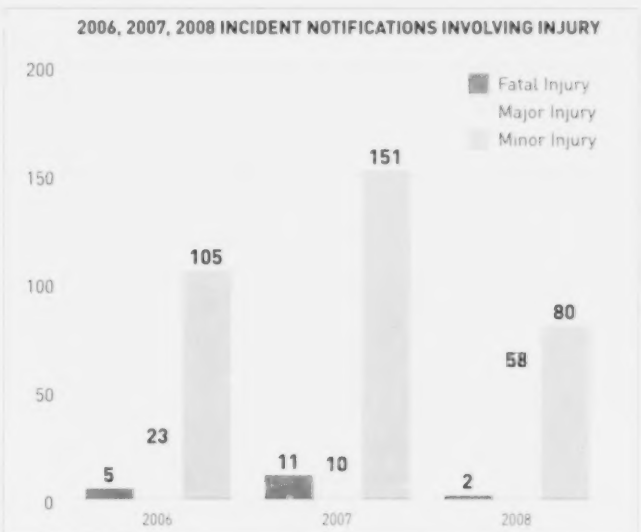
Injuries resulting from incidents are summarized as minor, major or fatal based on their classification. Injuries are not recorded in cases where investigation ruled out regulated equipment as the cause of the incident. This is often the case when electrical safety officers are requested by fire departments to assist in investigations because of their expertise. For example, in 2008, safety officers helped fire departments investigate seven fire-related fatalities; these investigations determined that electrical equipment was not the source of ignition.

In 2008, there were 138 injuries and two fatalities. Of the 138 injuries, 80 (60%) were minor injuries (consisting of lacerations, contusions, abrasions or other similar injuries). All fatalities have a profound emotional impact on all involved. The BC Safety Authority is committed to assisting other authorities in their investigations into the circumstances of a death to prevent future death in similar situations.[5]

SUMMARY OF INJURIES SUSTAINED IN 2008 BY TECHNOLOGY

TECHNOLOGY	TYPE OF INJURY			TOTAL
	MINOR	MAJOR	FATAL[6]	
Amusement Rides	12	1	0	13
Boilers, Pressure Vessels and Refrigeration	3	0	0	3
Electrical	11	4	0	15
Elevating Devices	11	2	0	13
Gas	0	34	2	36
Passenger Ropeways	43	17	0	60
Railways	DATA NOT AVAILABLE			

The total number of minor injuries sustained in incidents in 2008 decreased to 80 from 151 in 2007. While there were decreases in both fatalities and minor injuries, there was a marked increase in major injuries. Much of this increase can be attributed to a single incident in an industrial plant where 27 people reported the symptoms of carbon monoxide poisoning due to an inadequately vented boiler.



5 The facts of all sudden or unexpected deaths must be ascertained and clarified by the BC Coroner Service to determine how, when, where and by what means the death occurred.

6 There were seven fire-related fatalities reported in the electrical technology. In all cases, investigation ruled out electrical equipment as the source of ignition.

AMUSEMENT RIDES

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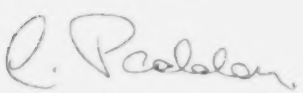


Greg Paddon
Amusement Rides & Passenger Ropeways Safety Manager

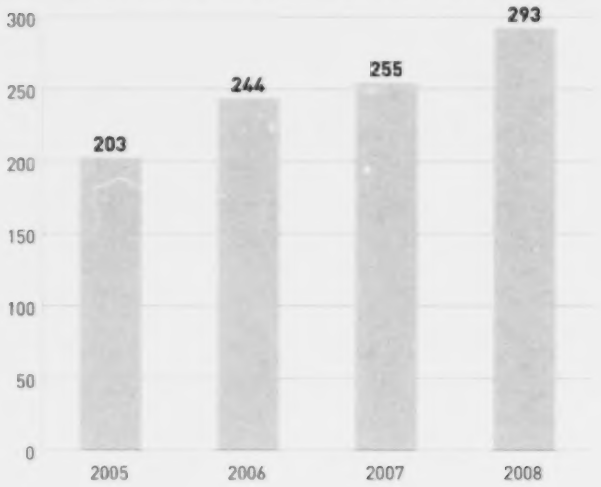
INSPECTION ACTIVITY IN 2008

Amusement ride safety officers conducted 293 inspections in 2008, a 15% increase in inspection activity over the prior year as a result of registering more amusement rides. The number of registered rides increased from 369 in 2007 to 373. In addition to inspection activities, safety officers continued to coach and assist the amusement ride industry on the registration of previously unregistered rides. Since 2006, the number of licensed contractors has increased by 68% to 138. It is estimated that approximately 92% of the industry is now licensed by the BC Safety Authority and we will continue our ongoing education effort to bring these devices into conformance with the applicable *Act* and *Regulations*.

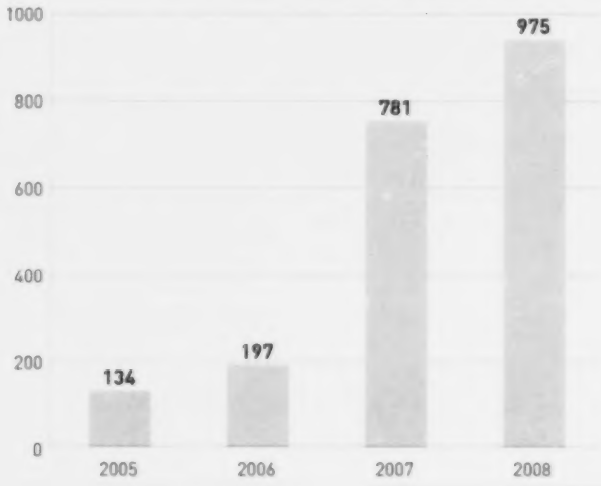
In 2006, the responsibility for amusement ride inspection was assigned to the passenger ropeway program as the amusement ride technology had both an operational and maintenance component similar to the passenger ropeway technology. Safety officers received amusement ride-specific technical training for accreditation from the National Association of Amusement Ride Safety Officials. More extensive technical knowledge of amusement rides as well as increased inspection activity has resulted in the identification of greater numbers of unregistered equipment, compared to 2006 and 2007.

On January 1, 2008, eleven recreational railways were reclassified from recreational railways to 'heritage railways' and they are now regulated under the Railway Safety Program. Seven of the 18 small gauge railways, previously classified as recreational railways and now identified as 'train rides', remain under the oversight of the Amusement Rides Safety Program and will be regulated as amusement rides under the *Elevating Devices Safety Regulation*.

AR.1 AMUSEMENT RIDES INSPECTIONS PERFORMED (2005-2008)



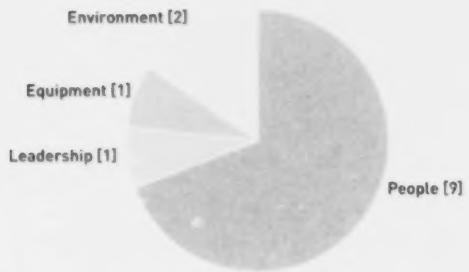
AR.2 AMUSEMENT RIDES NON-COMPLIANCES FOUND ON INSPECTION (2005-2008)



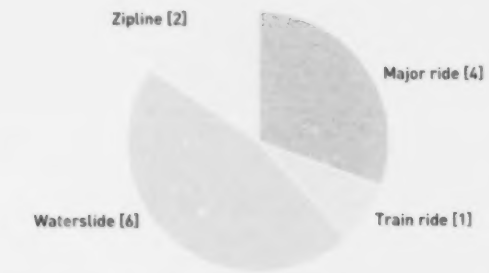
INCIDENTS IN 2008

AR.3 INVESTIGATION OUTCOME OF REPORTED CASES
TOTAL NUMBER OF REPORTED CASES: 18

AR.4 INCIDENTS BY IDENTIFIED CAUSE
NUMBER OF CONFIRMED INCIDENTS: 13



AR.5 EQUIPMENT INVOLVED IN AMUSEMENT RIDE INCIDENTS
NUMBERS OF CONFIRMED INCIDENTS: 13



There were 18 amusement ride incidents reported to the BC Safety Authority in 2008, resulting in one individual sustaining serious injuries and 12 individuals sustaining minor injuries. The serious injury took place on a waterslide. The incident investigation attributed the injury to inappropriate rider behaviour that occurred after the individual had been cautioned by the waterslide attendant. The slide operator's procedures were satisfactory if followed by riders and therefore this incident did not result in any changes to our waterslide policies.

Lack of rider attention was the cause of six incidents, and three incidents were attributed to the ride operations. In one instance, where a roller coaster car became stuck on the track and subsequently derailed, the cause was attributed to improper repair procedures. No injuries to passengers occurred, and the ride was removed from service. Safety officers directed the contractors responsible for these devices to review their procedures for inspection after completing annual maintenance work to ensure adequate repairs were carried out. The continued interaction with contractors, operators and the BC Safety Authority will encourage procedures that are effective in confirming that maintenance work has been completed properly.

One incident was a result of maintenance error while two incidents were a result of environmental conditions.[7] The incident cause was undetermined in five cases.

[7] 'Environmental condition' or 'Environment' is a defined incident cause and refers to incidents primarily caused by weather or naturally occurring conditions. For more information on the terms used to describe the defined causal factors, see our Definitions on page 46.

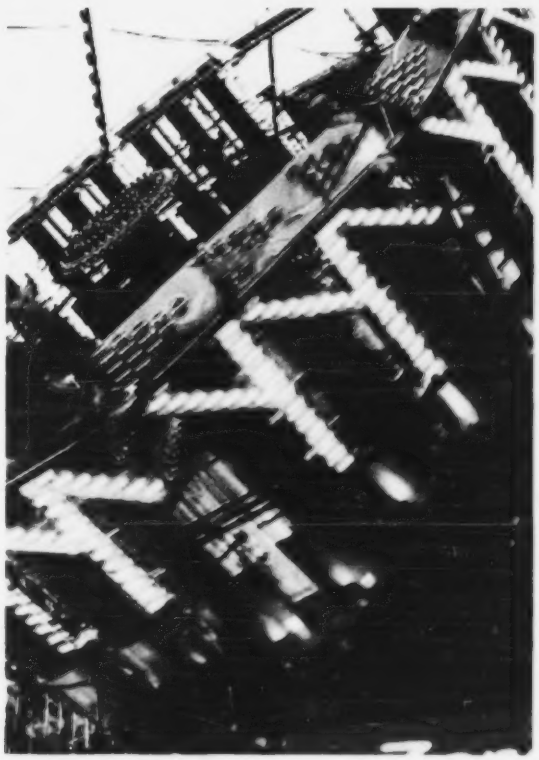
IMPROVING PUBLIC SAFETY

In the fall of 2008 the Provincial Safety Manager for amusement rides gave a presentation to industry stakeholders and fair organizers from across the province at the BC Association of Agricultural Fairs and Exhibitions Convention. The presentation provided information on licensing and permit requirements, and it emphasized the importance of hiring licensed amusement ride contractors for exhibitions.

The BC Safety Authority continued its development of zipline safety policies. There are currently no national code or published safety standards that have specific requirements for these kinds of amusement operations and safety officers have been applying the general safety rules from the Canadian Standards Association amusement ride codes. The number of zipline operations in BC is growing rapidly and the incorporation of more sophisticated designs allows riders to reach speeds of more than 100 km/hr. Safety officers are educating zipline contractors on proper installation procedures and are reviewing operations manuals to identify non-compliances that could potentially impact public safety, such as zipline guide (personnel) communication protocols. The data gathered through our interaction with zipline operations will be used to develop safety standards specific to ziplines.

FUTURE OUTLOOK AND TRENDS

The BC Safety Authority is a member of the committee harmonizing the Canadian Safety Code[8] with the American standard for Amusement Rides and Devices.[9] The updated standard incorporates recent advances in the amusement rides technology; as well, the development of a ride technology-specific standard will benefit amusement ride contractors in British Columbia by creating a common North American standard. The harmonization committee is scheduled to complete the updated code, which includes all of the amusement ride standards published by the American Society of Testing and Materials for adoption by Canadian regulators in 2009.



[8] Canadian Standards Association CSA Z267-00 – Safety Code for Amusement Rides and Devices.
[9] American Society of Testing and Materials ASTM F24.

BOILERS, PRESSURE VESSELS & REFRIGERATION

The Boilers, Pressure Vessels and Refrigeration Safety Program oversees the construction, installation and operation of boilers, pressure vessels and refrigeration plants in accordance with the *Safety Standards Act* and the *Power Engineers, Boilers, Pressure Vessel and Refrigeration Safety Regulation*. In addition to promoting the safe operation of this equipment, the BC Safety Authority reviews new boiler and pressure vessel designs prior to construction to ensure they meet safety code requirements. Through the Boilers, Pressure Vessels and Refrigeration Safety Program, the BC Safety Authority also administers the licensing of contractors and certification of power engineers.

2008 BOILERS, PRESSURE VESSELS AND REFRIGERATION SAFETY PROGRAM ACTIVITY

SUMMARY

In 2008, the Boilers, Pressure Vessels and Refrigeration Safety Program conducted activities in all four pillars in the Accident Prevention Model. The inspection program was the key activity. Traditionally, inspection has been based on periodic in-service inspection, with the inspection requirements and frequency determined by the size and type of equipment, not the highest hazards. This year, research to analyze risk exposures such as bulk propane storage tanks started a shift to focus our inspection resources on higher risks. Propane storage sites throughout the province were inspected to assess the condition of these tanks and gather data that will be used to set up a risk-based inspection program.

Some of the education activities delivered by the Boilers, Pressure Vessels and Refrigeration Safety Program included seminars and on-site information sessions by safety officers on the proper maintenance for hyperbaric chambers, bio-fuel boiler technology, high pressure welding requirements, guarded controls systems and remote monitoring for pressure equipment.

The emphasis in 2008 was shifting inspection to higher-risk installations and educating equipment operators about non-compliances and unsafe practices; however, enforcement will become more prominent in 2009.

John Siggers
Boilers, Pressure Vessels & Refrigeration Safety Manager

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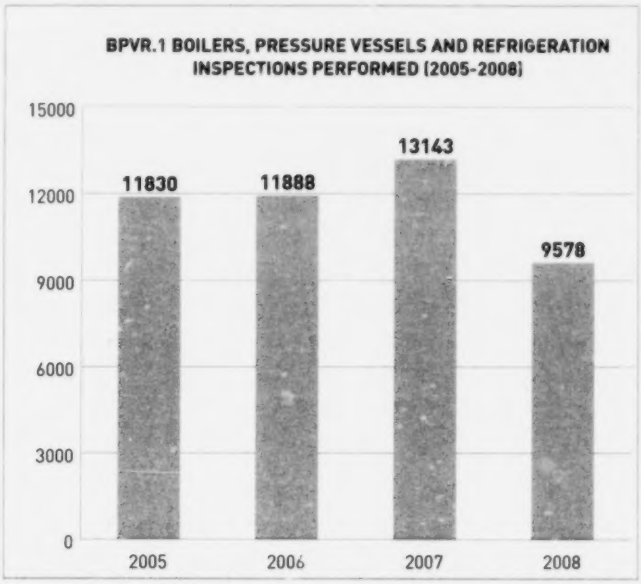
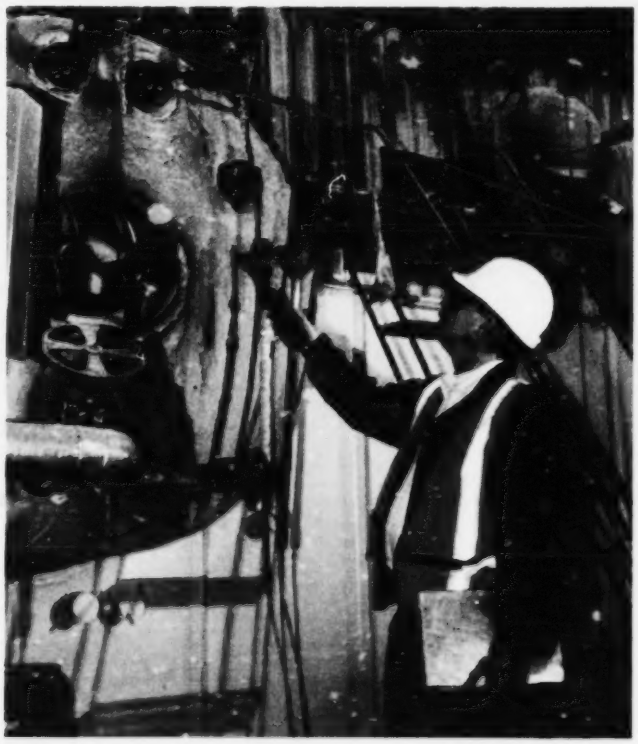
INSPECTION ACTIVITY IN 2008

In 2008, the Boilers, Pressure Vessels and Refrigeration Safety Program completed 9,578 inspections. These inspections included a wide range of activities such as performing internal inspections on boilers and pressure vessels, testing operating controls, reviewing the pressure testing of repaired and altered vessels and inspecting newly installed equipment for code compliance. The total number of inspections was fewer than in 2007, where 13,143 inspections were completed. This is in part due to a shift towards higher risk and therefore more complex assessments. More than 83 bulk propane storage plants were inspected by safety officers. The inspection findings were reviewed with the vessel owners and we started work on risk-based requirements for the maintenance, inspection and operation of the propane storage vessels. Additionally, two Equivalent Standard Agreements (ESAs) were approved in 2008 so that a total of six companies have now developed and approved safety management plans.

Operating permits for boilers, pressure vessels and refrigeration systems have increased to 56,825, from 56,102 in 2007. The BC Safety Authority's Engineering and Research department reviewed 2581 designs for boilers, pressure vessels, fittings and pressure piping systems submitted for registration from owners, licensed contractors, consulting engineers, manufacturers or designers who must have their designs registered prior to construction.

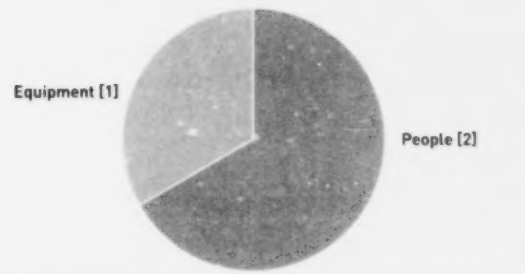




INCIDENTS IN 2008

BPVR.2 INVESTIGATION OUTCOME OF REPORTED CASES
TOTAL NUMBER OF REPORTED CASES: 7

BPVR.3 BOILERS, PRESSURE VESSELS AND REFRIGERATION INCIDENTS BY IDENTIFIED CAUSE
NUMBER OF CONFIRMED INCIDENTS: 3



BPVR.4 EQUIPMENT INVOLVED IN BOILERS, PRESSURE VESSELS AND REFRIGERATION INCIDENTS
NUMBER OF INCIDENTS: 3

Seven incidents involving boilers, pressure vessels, pressure piping or refrigeration systems were reported in 2008. Minor injuries to three individuals were reported after an accident due to a failure of regulated equipment. Two incidents were a result of human error and one incident was attributed to a manufacturing flaw. There was a release of ammonia from an ice rink refrigeration system that resulted in the evacuation of the recreational facility, which was carried out without injury. After this incident, safety officers worked with the operator of the facility to review its procedures and operations. The results of this review initiated a number of actions pertaining to alarm settings, emergency response plans, operator training and warning signs to reduce the likelihood of future ammonia releases.

IMPROVING PUBLIC SAFETY

The BC Safety Authority designed a new online power engineer examination application program that will be used in 2009. Power engineers wishing to challenge examinations will be able to apply and complete the test online at designated service offices throughout the province. The results from the tests will be available immediately and there will no longer be a wait time to receive examination results. The paperless process technology for power engineers' certification – along with an evaluation of experience – will be the first of its kind in Canada and will improve public safety by reducing the amount of time it takes for operators who are on interim status to become fully certified.

In 2008, the BC Office of Housing and Construction Standards, Alberta Municipal Affairs, Alberta Boiler Safety Authority and the BC Safety Authority met several times to address regulatory differences and create common standards between Alberta and BC for boilers, pressure vessels, piping, pressure welding and requirements for operating engineers as part of the implementation of the Trade, Investment and Labour Mobility Agreement (TILMA). With input from these meetings, the BC Safety Authority has forwarded Recommendations for Amendments to the Province for proposed changes to the *Power Engineers, Boilers, Pressure Vessels and Refrigeration Safety Regulation* necessary for TILMA. The TILMA objectives will be implemented April 1, 2009. This harmonization of regulatory requirements between BC and Alberta will make safety analysis and enforcement much more effective.

Safety officers conducted site visits to schools and hospitals in several locations throughout the province where they discussed with administrative staff inspections, operation and maintenance of their heating and air conditioning systems. Safety officers also reviewed the Accident Prevention Model with clients and discussed the advantages of clients developing their own Integrity Management Systems (IMS) to assist them in maintaining their equipment in a safe and efficient manner. These institutions were receptive to the concept and the first Integrity Management System in a health authority was implemented at one large hospital.

Hyperbaric chambers located in hospitals, clinics and universities are used to treat various medical conditions and decompression sickness in the diving industry. These pressure vessels are designed for human occupancy and therefore compliance with all safety standards is particularly important. The Boilers, Pressure Vessels and Refrigeration Safety Program conducted a special inspection program for these vessels and inspected 10 facilities to ensure any non-compliances with code were corrected.

Safety officers worked with companies constructing facilities for the Vancouver 2010 Olympic Winter Games to ensure that the equipment installations conformed to British Columbia's safety standards and that the facilities were built by licensed contractors under permit. They also ensured that the completed facilities had the required operating permits and were staffed by qualified personnel.

FUTURE OUTLOOK AND CHALLENGES

The work that we have undertaken to implement TILMA presents an opportunity for the BC Safety Authority to provide national leadership on the Canadian standardization of those occupations (such as power engineers) under the *Safety Standards Act* that are subject to both TILMA and the Agreement on Internal Trade (AIT), which comes into effect April 2009. The BC Safety Authority staff will continue to monitor the developments occurring at a national level with an eye toward developing a rationalized national playing field for affected occupations.

In 2009, the first audit of an Equivalent Standards Agreement will be performed to ensure the safety management plans were adequately administered. The audit findings will be shared between the Equivalent Standards Agreement holder and the BC Safety Authority to ensure the purpose of the safety management plan is being achieved.

The availability of large amounts of beetle kill wood and methane from landfill sites or agriculture wastes has created intense interest in using these biofuels in boilers to generate power in many communities throughout the province. The BC Safety Authority worked closely with the provincial government and other interested groups to develop a strategy to implement this technology in community energy projects while ensuring compliance to applicable safety codes. Currently, we are working with clients to support completion of projects in Kamloops, 100 Mile House and Vancouver. Meetings and site visits have been conducted with the developers of Syngas (gasification) technology to share knowledge regarding the design of boilers and pressure vessels to resolve issues with the maintenance, training and operations of this new technology.

ELECTRICAL

The Electrical Safety Program oversees the safety of electrical systems across British Columbia through the administration of the *Safety Standards Act* and the *Electrical Safety Regulation*. The BC Safety Authority is responsible for delivering electrical safety services for all areas of the province with the exception of eight municipalities: Burnaby, Maple Ridge, North Vancouver (City and District), Surrey, Vancouver, Victoria and West Vancouver. The electrical safety services we deliver cover all types of electrical installations in residential, commercial and industrial sites.

2008 ELECTRICAL SAFETY PROGRAM ACTIVITY

SUMMARY

The 2008 Electrical Safety Program allocated more resources to the education pillar from the Accident Prevention Model; however, inspection was the primary activity.

Several new education programs were developed for the electrical contracting community to provide information on the safe installation of equipment, such as portable generators. These programs were a key part of our proactive safety strategy and will be expanded in 2009.

Inspection remained an important component of the 2008 work plan, focusing on higher-risk activities such as high-voltage installations. A large increase in permits during 2008 saw a corresponding increase in inspection activity.

Research based on the investigation of incidents reported to the Electrical Safety Program showed that the majority of incidents were fires, and in many cases, our investigations either ruled out electrical equipment as the fire source or the damage was too extensive to definitively determine a cause. Also noted in this research were injuries to workers from inadequate safety procedures, and we continue to provide educational sessions on safe electrical work practices with electrical contractors and electrical apprentice training institutions.

Stephen Hinde, P.Eng.
Electrical Safety Manager

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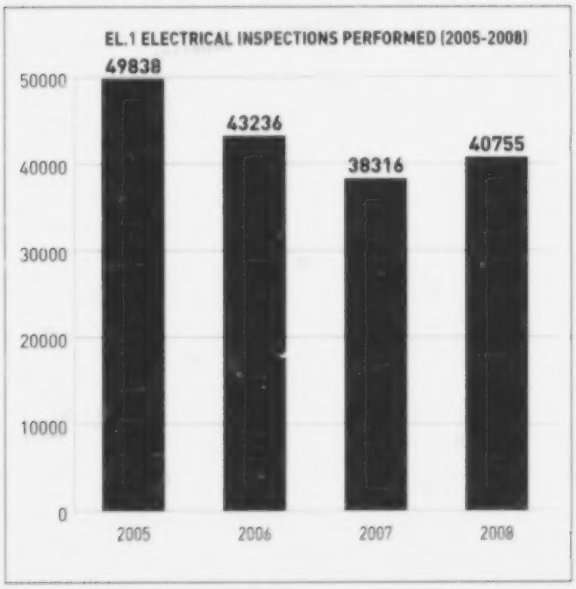
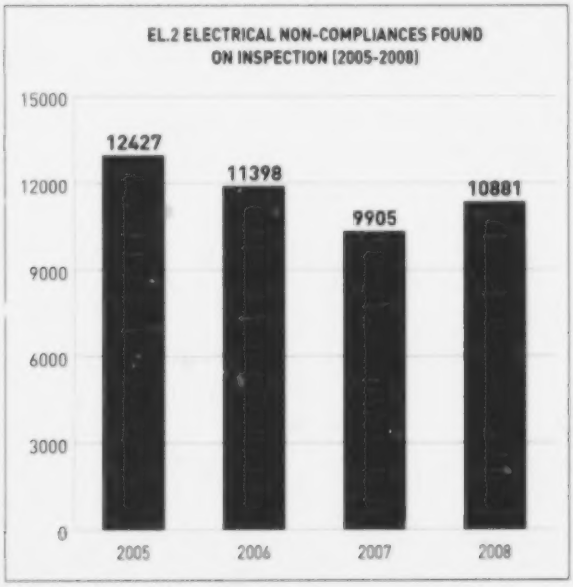
Stephen Hinde, P.Eng.
Electrical Safety Manager

INSPECTION ACTIVITY IN 2008

In 2008, we issued more than 65,000 electrical installation permits, a 6% increase over 2007 and there was a corresponding increase in the number of inspections performed. Of these, our safety officers identified and inspected almost 41,000 as higher-risk installations. The emphasis on higher-risk installations resulted in a 10% increase in non-compliances found.

The Electrical Safety Program also certifies individuals as Field Safety Representatives. These individuals are responsible for ensuring that electrical work is performed in a manner that is consistent with the code and regulatory requirements. They are accountable for any non-compliances and must submit a declaration of compliance to the BC Safety Authority.



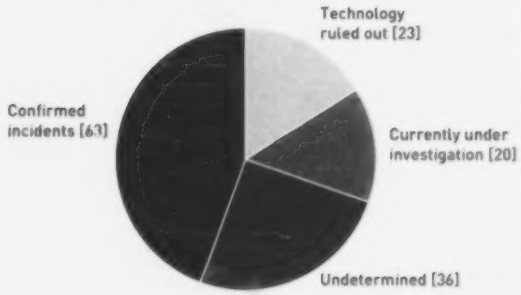


INCIDENTS IN 2008

In 2008, 142 incidents potentially involving electrical equipment were reported to the BC Safety Authority. Investigation ruled out the involvement of electrical equipment in 23 of the reported incidents, and in 36 cases the exact cause of the incident could not be determined. Many undetermined causes were as a result of fire destroying evidence that would have allowed investigators to conclude the cause.

The majority of electrical incidents were fires started by faulty equipment or equipment used in an inappropriate manner. The primary cause was from people improperly using equipment, using electrical devices for unintended purposes or not maintaining equipment in good operating order. Some examples of these incidents include leaving operating heaters unattended, placing equipment too close to combustibles and overloading circuits. Many of these accidents occurred because people were not knowledgeable about proper operating, maintenance or safety precautions.

EL3. INVESTIGATION OUTCOME OF REPORTED CASES
TOTAL NUMBER OF REPORTED CASES: 142



EL4. ELECTRICAL INCIDENTS BY IDENTIFIED CAUSE
TOTAL NUMBER OF REPORTED CASES: 63

There was one major injury consisting of an electrocution and five minor injuries consisting of electrical burns to workers where occupational health and safety procedures were not followed. The primary cause of injury was workers exposed to arc-flash.[10] In 2008, the Canadian Standards Association developed a new standard[11] for electrical workplace safety that contained guidelines for work in the vicinity of exposed energized electrical systems. At contractor meetings around the province, and at presentations with other stakeholders, the BC Safety Authority has been promoting the use of this standard by educating workers about the hazards of arc-flash. Our safety officers use personal protective equipment and proper tools as required by this standard.

The decline in world metal prices has led to a significant reduction in the incidence of copper theft. While the theft of critical safety grounding equipment was an important contributing factor of incidents in 2007, no incidents of this type were reported in 2008.

[10] 'Arc-flash' is a violent explosion caused by the extreme heat in electrical components from a short circuit condition.
[11] Canadian Standards Association CSA Z462 – Workplace Electrical Safety.

IMPROVING PUBLIC SAFETY

In 2008, the BC Safety Authority issued a directive[12] outlining the requirements to approve electrical equipment in manufactured homes. This was an important initiative to ensure the safety of manufactured homes offered for resale that did not have factory certification. Significant safety checks were required for these older homes to identify and correct non-compliances.

We held educational sessions with contractors and apprenticeship institutes to discuss safe electrical work practices. The BC Electrical Code requires that all electrical work be performed in a de-energized condition, except where that is impractical. National standards exist[13] to protect both workers and others nearby from electrical contact or arc-flash. The BC Safety Authority continues to promote these safe work practices for all work on electrical equipment.

The BC Safety Authority worked with service providers to the Vancouver 2010 Olympic Winter Games to ensure that bid packages included the necessary components to meet safety requirements. High profile international events draw equipment and workers from the global marketplace, and it is important to ensure that the equipment and installations meet British Columbia's safety standards. Facilities that have been constructed to service this event have been built by licensed contractors under permit, and in many cases have been inspected for code compliance.

FUTURE OUTLOOK AND CHALLENGES

In 2009, British Columbia is expecting to adopt the 2009 Canadian Electrical Code Part 1, with minimal amendment, as the BC Electrical Code. Adoption of the new code will require changes in installation practices in some areas, and we will arrange educational sessions to help contractors make these changes in practice. British Columbia has worked over the last two code cycles to minimize amendments, which enhances the mobility of workers from other jurisdictions. On April 1, 2009, the Trade, Investment, and Labour Mobility Agreement (TILMA) came into effect, as well as the Agreement on Internal Trade (AIT). These agreements between the provinces recognize regulated workers from other jurisdictions. We are developing new policies and procedures to administer these new regulations.

Counterfeit and unapproved electrical equipment remains a challenge to the industry. Safety officers continue to find unapproved or counterfeit equipment, and reports are received from contractors who also discover similar equipment. The BC Safety Authority will work with certification agencies and national enforcement agencies to counteract this global issue by reporting instances of counterfeiting to those agencies and cooperating in their investigations.

[12] Directive No. D-E3 080606 1 – Approval of Manufactured Homes, Recreational Vehicles, and Factory-Built Structures. Date of issue: June 6, 2008.
[13] Canadian Standards Association CSA Z462 – Workplace Electrical Safety.

ELEVATING DEVICES

The BC Safety Authority is responsible for overseeing the safety of elevators, escalators, moving walkways, dumbwaiters, lifts and construction hoists in accordance with the *Safety Standards Act* and the *Elevating Devices Safety Regulation.*

2008 ELEVATING DEVICES SAFETY PROGRAM ACTIVITY

SUMMARY

In 2008, the focus of the Elevating Devices Safety Program remained inspection, and those resources continued to shift to units in service that present the highest safety risk. A combination of additional resources and inspection efficiency gains allowed us to conduct more inspections and assess more operating units for safety compliance. The focus of resources on in-service inspections will continue in 2009.

A series of education and outreach activities was conducted in 2008. At the Canadian Elevator Contractors Association (CECA) meeting held in February 2008, the Accident Prevention Model was the main topic of discussion and it was used as an opportunity to dialogue with the elevator industry regarding tangible examples of the four pillars, code updates and to address industry issues. At the Annual School Plant Officials Association of BC Conference in Penticton, the BC Safety Authority's presentation centered on owner responsibility, regulatory obligations and incident reporting for elevating devices. The Escalator and Elevator Safety Rider program continues to educate young children on the safe and proper use of elevators, escalators and moving walks. As the BC Safety Authority moves forward with implementing our Accident Prevention Model, education initiatives in 2009 will include seminars with building owners and property managers. Industry meetings will focus on upcoming code changes, safety bulletins and the proposed standards for the qualification and licensing of elevator mechanics.

Enforcement activities included the shutdown of units that posed a safety risk to the public and the issuance of compliance orders to contractors without licences or to those who did not obtain required permits, as well as to address overdue non-compliances.

Research involved the review of new safety codes for adoption in British Columbia. Additionally, we worked with an ad hoc issue group of the BC Safety Authority's stakeholder technical committee to study and develop requirements for residential elevators and chairlifts.

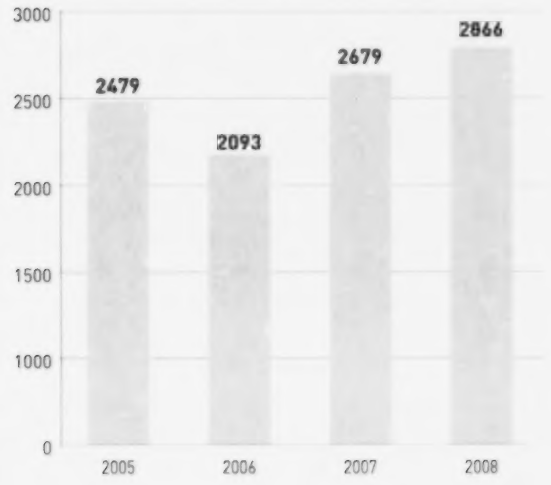
Janice Lee, P.Eng.
Elevating Devices Safety Manager

INSPECTION ACTIVITY IN 2008

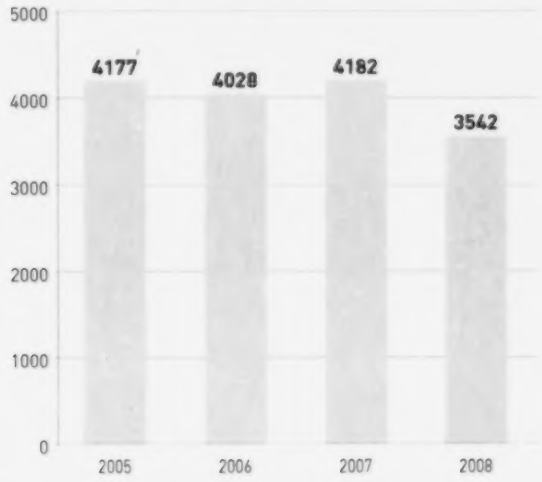
There were more than 23,000 elevating devices registered with the BC Safety Authority in 2008, and we completed 2,866 inspections on these devices. The BC Safety Authority must inspect all new elevating device installations before we can certify the new units for operation. We also inspected operating units on a periodic basis using a risk assessment program to identify high-risk units. Increased staff resources enabled us to conduct 187 more inspections than in 2007. Three safety officers will be dedicated to full time in-service inspections in 2009 so that more higher-risk units can be inspected.

In 2008, we modified our approach for inspecting new installations to focus on educating contractors, which enables us to conduct inspections when the units are ready for operation instead of conducting multiple inspections prior to final acceptance. This approach had the direct result of improving compliance, as the number of non-compliances found on inspections was reduced from the numbers noted in previous years.

ED.1 ELEVATING DEVICES INSPECTIONS PERFORMED (2005-2008)

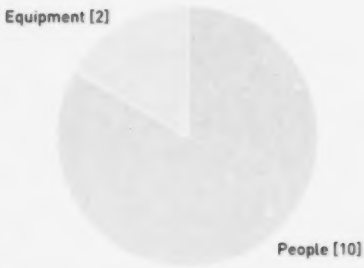


ED.2 ELEVATING DEVICES NON-COMPLIANCES FOUND ON INSPECTION (2005-2008)



ED.3 INVESTIGATION OUTCOME OF REPORTED CASES
TOTAL NUMBER OF REPORTED CASES: 20

ED.4 INCIDENTS BY IDENTIFIED CAUSE
NUMBER OF CONFIRMED INCIDENTS: 12



ED.5 EQUIPMENT INVOLVED IN ELEVATING DEVICES INCIDENTS
NUMBER OF CONFIRMED INCIDENTS: 12

There were 20 incidents reported to us in 2008, down from 51 in 2007. Eight of these incidents remain under investigation. The reports on the closed investigations concluded that all 12 incidents involved elevating devices. There were two major injuries resulting in broken bones and 11 minor injuries from these incidents. These injuries were from slips, trips or falls on escalators. In 10 incidents, the identified cause of the incident was lack of attention or incorrect use of the elevating device.

IMPROVING PUBLIC SAFETY

Incident data indicated that trips or falls on escalators were reoccurring incidents on elevating devices, and that the majority of these incidents resulted from the actions of the riders, which included the use of strollers, motorized scooters and small shopping carts on the escalators. We identified one particular location where a high number of incidents occurred and we mandated the posting of signage on the proper use of escalators as well as the installation of stanchions to prevent the use of shopping carts on the escalators. Ongoing monitoring of the escalators at this location indicated that incidents had decreased but were still occurring. In 2009, we are planning to conduct an Escalator Rider Safety Program at the site to educate the public on the safe use of escalators.

Analysis of incidents on moving sidewalks completed in 2007 highlighted an equipment problem with the wheels of shopping carts. We recommended safety measures to prevent further accidents that included:

- Ensuring the compatibility of the shopping cart wheels with the treads on the moving walk;
- Incorporating a locking device into the wheel design to prevent movement while the shopping cart is being used on the moving walk;
- Submitting a maintenance plan containing procedures for the maintenance, inspection and repair of shopping carts;
- Taking shopping carts needing repair out of service and testing them to ensure the wheels engage properly; and
- Requiring a 'Maintenance Logbook' containing detailed records of all tests, inspections and other maintenance for five years.

There have been no further incidents reported since the implementation of these measures.

In 2006, an ad hoc issue group of the Elevating Devices Technology Committee began developing professional standards for the training and qualification of elevating device mechanics; this work continued through 2008. Standards for prerequisite education programs, practical work experience, recording experience, grandparenting of mechanics presently working in the system and the administration of examinations, certification and licensing have been completed. The next steps will be consultation with a wide range of stakeholders and other interested parties prior to implementation.

The BC Safety Authority continued to reduce the number of owners not in compliance with requirements for maintenance programs. Each elevating device must have a minimum of quarterly maintenance by a licensed contractor to ensure the device is in safe operating condition. We have implemented numerous enforcement actions, including the issuance of 29 compliance orders to address outstanding non-compliances and the shutdown of units.

We reviewed the technical, regulatory and service delivery issues pertaining to the adoption of CSA B44-2007 Safety Code for Elevators and Escalators, B44.2 Maintenance Requirements and Intervals for Elevators, Dumbwaiters, Escalators and Moving Walks and B44.7 Performance Based Code for Elevators and Escalators. We will prepare a request for amendment to be submitted to the Province, recommending adoption of these codes, in 2009.

The review of residential elevators by an ad hoc issue group of the Elevating Devices Technology Committee continued throughout 2008. This work included the identification of the number of units in British Columbia and the companies that install or maintain these devices, a review of the applicable safety standards and the study of how other jurisdictions and regulatory agencies are administering safety regulations for private residential elevating units. In 2009, we are planning to approach issues around residential elevators with education programs targeted at the equipment users and the facilities housing the equipment.

FUTURE OUTLOOK AND TRENDS

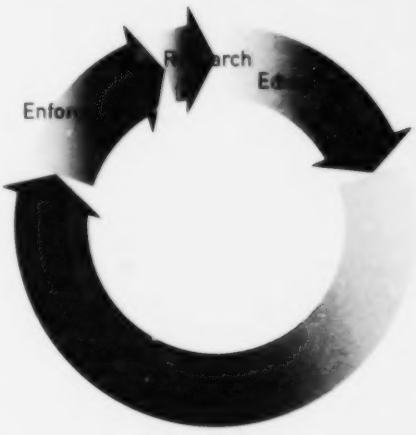
The Elevating Devices Technology Committee has formed an ad hoc issue group to study and make recommendations regarding emergency operations of elevating devices. There are conflicting requirements between the safety codes for elevators and the BC Building Code, as well as differences among municipalities administering the BC Building Code. The ad hoc issue group will work toward establishing consistent and effective emergency procedures.

With the adoption of CSA B44-2007 Safety Code for Elevators and Escalators planned for 2009, hydraulic elevators with in-ground hydraulic cylinder systems that do not have a safety bulkhead (also known as single-bottom cylinders) will need to be retrofitted. This will require installing a new cylinder conforming to the 2007 code or a retrofit of the elevator system with mechanical safety devices such as car safeties or plunger grippers. In 2009, we will be organizing seminars with building associations as well as consulting with industry around this safety issue.

GAS

The Gas Safety Program is responsible for the safety of gas distribution systems and any equipment using natural gas, propane, hydrogen or digester and landfill gas. The BC Safety Authority provides gas safety services for nearly 1.2 million homes throughout British Columbia. This figure excludes homes in Burnaby, Kelowna, Maple Ridge, North Vancouver (City and District), Richmond and Vancouver, where municipal governments provide gas safety services.

2008 GAS SAFETY PROGRAM ACTIVITY



SUMMARY

In 2008, the Gas Safety Program shifted inspection resources to the higher safety risks identified by a Risk Assessment Program. This scientific approach allowed safety officers to assess and prioritize all inspection requests to focus on the higher-risk installations. This targeted inspection program resulted in decreased inspections but the number of non-compliances found through those site inspections increased from 2007 to 2008. This inspection program has facilitated a shift in resources to education and allowed safety officers the time to educate both gas contractors and fitters about the importance of safe practices and regulatory compliance.

There was a noted increase in line hits that damaged underground gas systems in 2007. Although the *Gas Safety Regulation* does not regulate excavators, it guides and regulates those working in the vicinity of underground gas lines. An inspection, education and research project called *Can You Dig It?* was developed to address damage to underground gas lines and delivered in 2008.

Increased enforcement activities in 2008 included a 41% increase in compliance orders from 65 in 2007 to 92 in 2008. Four monetary penalties were issued to those individuals posing significant safety risks to the public or to those working outside the safety system.

As compliance issues arise, continued enforcement work into 2009 is likely to include the issuing of safety orders, discipline orders, and compliance orders. This increase in enforcement activity will complement our education and inspection activities and support the prevention of accidents.

Wayne Lock
Gas Safety Manager

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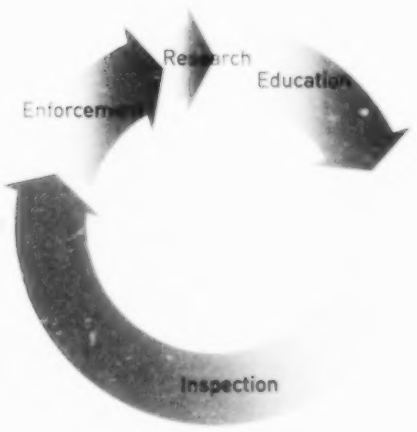

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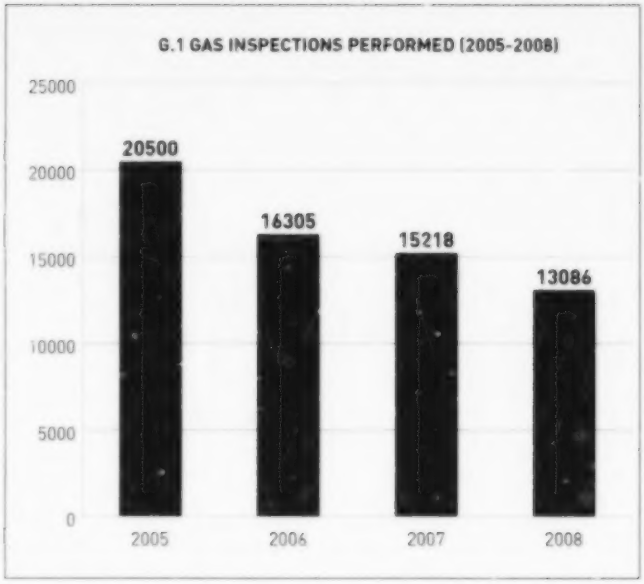
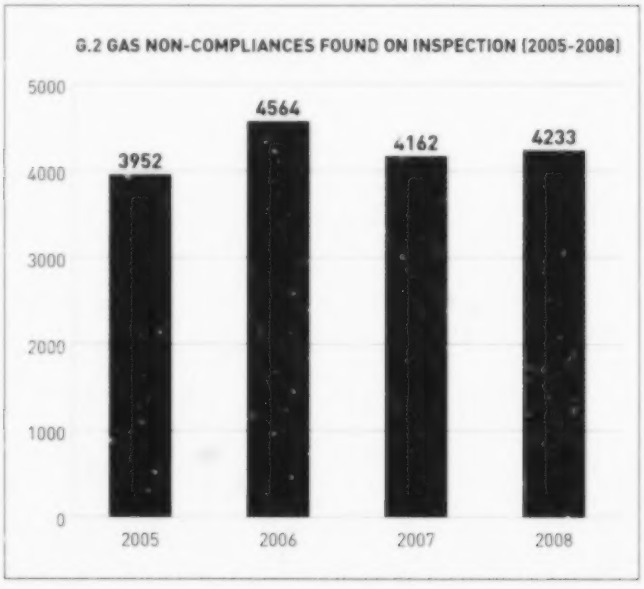
INSPECTION ACTIVITY IN 2008

In 2008, more than 39,000 installation permits were issued. Safety officers conducted more than 13,000 inspections, which were focused on higher-risk installations and higher-risk work identified by a Risk Assessment Program (RAP). The Risk Assessment Program is a methodology developed in 2008 and piloted in the Gas Safety Program to evaluate the performance of individual contractors. Contractors who consistently completed regulated routine work in accordance with the *Gas Safety Regulation* and safety codes were categorized as "low risk". Contractors who were regularly not in compliance were categorized as "higher risk". This assessment tool was used by safety officers to assess all installation permits to determine which were for higher-risk work and therefore required inspection.



The 13,086 inspections conducted in 2008 was a decrease from the 15,218 inspections completed in 2007. However, the 2008 inspections focused on the higher-risk work of poor-performing contractors and consequently there was a 17% increase in non-compliance issues. The Gas Safety Program is focusing its resources on areas of higher risk in order to reduce the risk to the public. If non-compliance issues remained unresolved, the safety officers initiated enforcement actions with the issuance of a compliance order to the contractor. Gas safety officers issued more than 90 compliance orders in 2008.



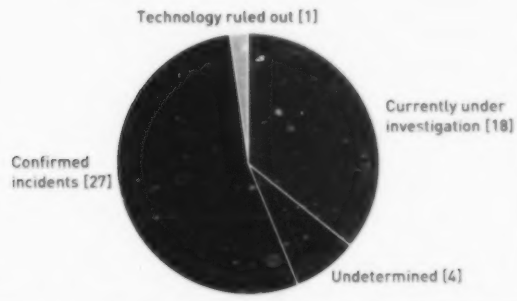
The Gas Safety Program moved towards an education and enforcement platform in 2008 and used education opportunities as a primary method for resolving safety issues. These education opportunities included holding town hall contractor meetings in communities.

INCIDENTS IN 2008

We received 50 incident notifications involving gas equipment or gas systems in 2008. This does not include all line hits reported by the gas utilities: gas utility companies operating distribution systems are responsible for establishing emergency procedures and training personnel to safely repair damaged gas lines. In most cases after a line hit, the gas lines are repaired and returned to service, after which the damage is reported to the BC Safety Authority and no further investigation is typically required. The utilities' reports include the number of line hits and their outcomes. Most line hits are classified as "near-miss" incidents because there are no injuries or damage, but under different circumstances contributory factors could have led to injury or death. In 2008, 1,509 line hits were reported by the gas utilities, a decrease from 1,750 in 2007.

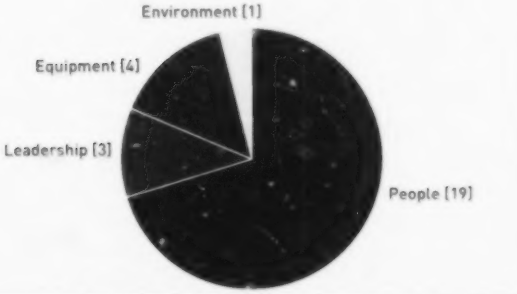
In 2007, we conducted an education program targeting individuals or companies that repeatedly caused damage to the underground infrastructure, and we completed a similar education project, called *Can You Dig It?* in July 2008. A gas safety officer responded to 38 near-miss incidents to collect information, educate and, if necessary, take enforcement action using compliance orders. We provided the damagers with an information package that included excavating safety literature from the utility and the BC Safety Authority's directive on safe operations around gas installations.[14] We issued 32 compliance orders where the damager failed to safely operate in the proximity of the gas line. More than 30% of the compliance orders issued by the Gas Safety Program were issued during the *Can You Dig It?* project. Our subsequent analysis of the collected data showed that 28 of the 38 cases (74%) of underground line damage resulted from insufficient procedures to locate the gas line.

G.3 INVESTIGATION OUTCOME OF REPORTED CASES
NUMBER OF CONFIRMED INCIDENTS: 50



In 2008, there was one fatality when a person was killed in a camper van fire while using a portable propane heater. It was undetermined whether the heater was the source of ignition of the fire that caused death, or whether the individual was killed by carbon monoxide from the heater.

G.4 INCIDENTS BY IDENTIFIED CAUSE
NUMBER OF CONFIRMED INCIDENTS: 27



An unexplained flammable vapour explosion at a residence resulted in severe injuries to two residents, and ultimately one fatality. The cause of this incident is under investigation.

The improper use or inadequate maintenance of gas equipment causing carbon monoxide poisoning resulted in 34 major injuries. At the time of publication, 18 incidents remain under investigation, including one incident where 27 people were sent to hospital for carbon monoxide exposure due to a venting failure of a boiler.

[14] Information Bulletin No. B-GS 080221 1 – Operating Safely Around Underground Gas Services. Date of issue: April 28, 2008.

IMPROVING PUBLIC SAFETY

Carbon monoxide poisoning continues to be a high risk identified in the gas technology. We conducted an in-depth causal analysis based on information gathered from an incident investigation in 2007 that resulted in two fatalities. Based on the results of this analysis, we proposed a change to CSA B149.1, the Canadian Natural Gas and Propane Installation Code,[15] to improve the safety of propane refrigerators. In 2008, the Interprovincial Gas Advisory Council accepted our proposed change requiring venting on low-input gas appliances, and this change will be incorporated into the 2010 edition to the code.

In 2007, there was an increase in the number of hits to underground gas lines, with no clear basis for the increase. We asked the following questions:

- Why do individuals continue to damage underground gas lines?; and,
- What can be done to reduce the number of these types of incidents?

To answer these questions, a project called *Can You Dig It?* was developed. The goal of the project was to gain a greater understanding of these incidents as well as reduce the number of hits through an inspection and education program targeted at excavators. This project included a root cause analysis of the data collected and the development of accident prevention recommendations that were presented to both local industry representatives and at the Common Ground Alliance annual forum in Orlando, Florida. The recommendations will be followed up and measured in 2009.

FUTURE OUTLOOK AND CHALLENGES

With the many green environmental initiatives proposed by governments, the gas industry continues to explore the use of alternative and renewable fuel sources such as hydrogen and biogas for vehicles, heating and industrial production. Many of the alternative fuels are within the jurisdiction of the Gas Safety Program. The utilization of these alternative fuels requires new technology, which means that in many cases there are no applicable safety codes or standards. Ensuring the safety of the new technologies that make use of these fuels – and the development of adequate safety codes and standards – will present a challenge in 2009 and beyond. However, we will continue to collaborate with other organizations to promote the safe transition to alternate fuels.

[15] Canadian Standards Association CSA-B149.1 – Natural Gas and Propane Installation Code.

PASSENGER ROPEWAYS

The Passenger Ropeways Safety Program oversees the safety of the passenger ropeways throughout the province, including tramways, gondolas, chairlifts, rope tows and passenger conveyors. We inspect new, operating and modified units in accordance with the *Safety Standards Act* and the *Elevating Devices Safety Regulation*.

SUMMARY

The 2008 program for safety in the passenger ropeways technology again focused on the shift of resources to the Accident Prevention Model's education pillar. Research into data from incident reports from early in the 2008 snow sport season determined that young passengers continued to fall from chairlifts outside the loading and unloading areas.

Safety officers used strategies from the education pillar of the Accident Prevention Model and worked closely with the Education, Communication and Outreach department of the BC Safety Authority to develop an education and awareness program that focused on rider safety. The strategy was to shift the target audience of the 2007 education program from operators of passenger ropeways to the passengers themselves.

Although the passenger ropeways safety program shifted resources to education, the primary activity of the 2008 work plan was inspection. While the number of actual inspections was down slightly from 2007, the complexity of installations and incidents inspected was greater. The inspection strategy was to concentrate on the inspection of new passenger ropeway installations and major passenger ropeway incidents to gather data for future research. Additional safety officer resources were required to inspect the complex tri-cable gondola installation at Whistler/Blackcomb and for incident investigations involving falls from carriers and a gondola lift tower failure.

Valuable information collected during these inspections has provided data to our research group. Using tools such as root cause analysis, the research group will assist the passenger ropeways program in determining where safety officer resources will be allocated in 2009.

Greg Paddon
Amusement Rides & Passenger Ropeways Safety Manager

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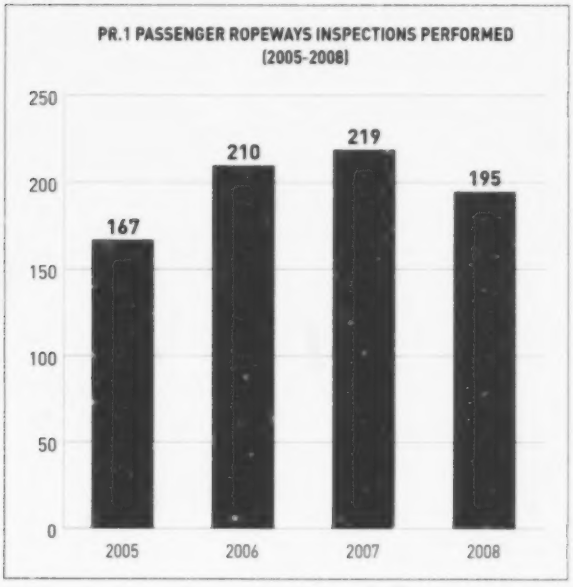
G. Paddon

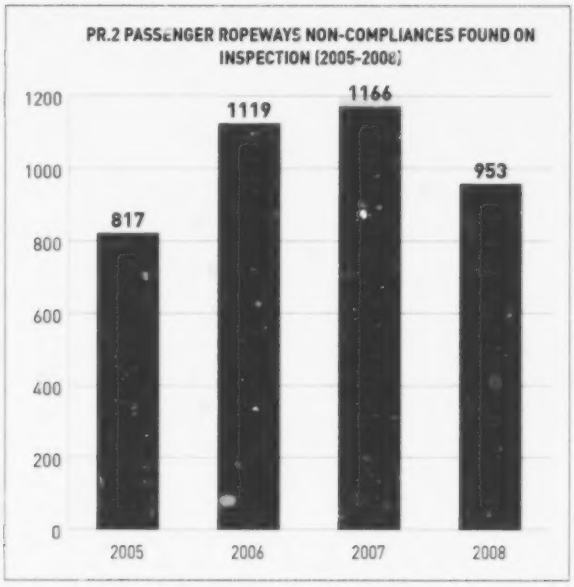
Greg Paddon
Amusement Rides & Passenger Ropeways Safety Manager

INSPECTION ACTIVITY IN 2008

Safety officers conducted 195 ropeway inspections in 2008 and recorded 953 non-compliances. The last six months of 2008 were a busy inspection period, with installations of new passenger ropeways as well as the completion of major modifications to existing passenger ropeways. We conducted 21 acceptance inspections for new equipment or modifications.

The BC Safety Authority completed the testing, acceptance inspection and commissioning of the gondola between Whistler and Blackcomb mountains, the largest tri-cable gondola in North America. One of the principal commissioning procedures was testing the emergency evacuation system, which presents unique challenges when the gondola spans a distance of over four kilometers at heights of up to 415 meters. The design of this ropeway incorporates many redundant operating systems making it very reliable and thereby mitigating the need for the use of conventional manual evacuation procedures in certain situations if equipment failure were to occur.





INCIDENTS IN 2008

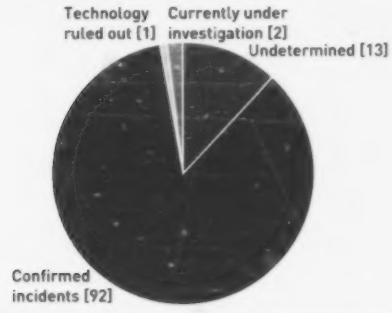
The BC Safety Authority received 108 incident notifications in 2008 resulting in 17 serious injuries and 43 minor injuries. In one incident, a rider experienced a heart attack prior to falling off the carrier: this incident is not attributed to the technology. The incident cause could not be determined in 16 instances and are excluded from analysis.

Most incidents occurred as a result of incorrect loading and unloading due to improper rider behaviour, such as not lowering safety bars or prematurely raising the safety bar, horseplay and entanglement with equipment. Both experienced skiers and riders as well as those new to snow sports were involved. Accordingly, we are increasing efforts to address falls and incidents in loading areas through education and awareness programs.

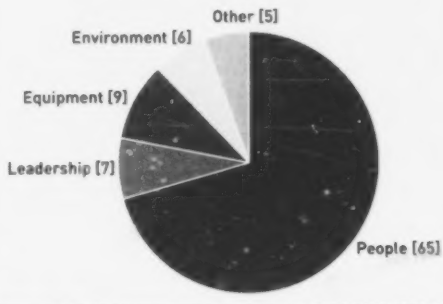
One incident involved a 12-year-old male snowboarder who was caught by the chin strap on his helmet during an attempt to evacuate him into a fireman's net after he failed to unload from a chairlift. The passenger's helmet became trapped between the carrier seat and the restraining device as the passenger was trying to position himself to drop into the safety net at the unloading station, resulting in a major injury. As a result of this incident, we issued a safety order[16] requiring all passenger ropeway contractors that operate above-surface ropeways to review their existing evacuation procedures for passengers who fail to load or unload. All affected contractors responded to the safety order as required and verified that procedures and training plans were in place for these types of evacuations.

A catastrophic failure[17] of a gondola lift tower also occurred in this reporting period. At the time of publication, the incident remains under investigation and has centered on the ingress of water into the tower structure; the subsequent expansion of the water due to freezing, also referred to as "ice jacking,"[18] is suspected to be the cause of the failure of the two-piece tower at the connection between the upper and lower tower sections. The BC Safety Authority required all passenger ropeway contractors that operate above-surface ropeways to conduct inspections on their tower structures[19] to determine if there was any accumulation of water within the structure and to take appropriate action. The manufacturer of the passenger ropeway involved in this incident identified additional measures to prevent similar failures and communicated these steps to all contractors operating similar equipment. All contractors affected by the safety order or the manufacturer's measures carried out the required actions.

PR.3 INVESTIGATION OUTCOME OF REPORTED CASES
NUMBER OF CONFIRMED INCIDENTS: 108



PR.4 INCIDENTS BY IDENTIFIED CAUSE
NUMBER OF CONFIRMED INCIDENTS: 92



[16] Safety Order No. SO-P4 080112 1 – Passengers Failing to Load or Unload from Above Surface Ropeways. Date of issue: January 22, 2008.
[17] 'Catastrophic failure' means a sudden, unexpected failure that occurred without prior indication of degradation causing the complete breakdown and collapse of a structure.
[18] 'Ice jacking' refers to the volumetric expansion of ice.
[19] Safety Order No. SO-P4 081222 4 – Inspection Requirements for Leitner Poma Sheave Assemblies. Date of issue: December 22, 2008.

IMPROVING PUBLIC SAFETY

Our safety officers continued to audit safety management plans submitted by passenger ropeway contractors. The intent of the plans is to ensure that passenger ropeway contractors are meeting their obligation to ensure their staff are properly trained and are maintaining all competencies required to perform regulated work.

The BC Safety Authority continued to develop education programs in 2008 in efforts to reduce falls from carrier incidents on above-surface ropeways such as chairlifts. The focus of our education efforts has shifted from passenger ropeway operations staff and ski schools to educating the public on site about safe riding behavior. A majority of falls from carriers occurred outside loading and unloading stations where skiers and riders are not supervised by lift operators. Safety officers carried out awareness and education programs at resorts educating skiers and riders on the causes of falls from lifts and the extent of lift-related incidents. This education program will continue into 2009. Education material such as a "Lower Your Restraining Device – It's Your Seatbelt" banner was developed by our safety officers and is now being used by various ski areas in British Columbia for public messaging.

FUTURE OUTLOOK AND TRENDS

As the Vancouver 2010 Winter Olympic Games approach, the BC Safety Authority anticipates more acceptance tests on new lifts being installed specifically for the Olympic Games; we will continue our audits of passenger ropeway contractors at Olympic venues. The high profile of the Olympic Games is expected to increase the number of people from all over the world using British Columbia's winter sports venues, and we anticipate an increase in new installations and modifications of older equipment in other parts of the province for 2009.

RAILWAYS

The BC Safety Authority regulates railway companies that operate solely within the province of BC and have a Minister's Certificate issued by the BC Ministry of Transportation and Infrastructure. These provincial railways are subject to the provincial *Railway Act*, the *Railway Safety Act* and the adopted federal railway safety legislation. Railway companies that operate nationally, such as Canadian Pacific and VIA Rail, are not under the jurisdiction of the BC Ministry of Transportation and Infrastructure but are regulated by Transport Canada. The Railway Safety Program regulates four classes of railways: Common Carrier (e.g. Southern Railway of BC, transporting passengers or goods and interchange rolling stock with other railways); Industrial Railways (e.g. Eurocan Pulp and Paper, serving an industrial site exclusively); Commuter Railways (e.g. SkyTrain, transporting passengers between urban locations); and Heritage Railways (e.g. Kettle Valley Steam Railway, operating historical rolling stock).

2008 RAILWAY SAFETY PROGRAM ACTIVITY

The Railway Safety Program is unique within the BC Safety Authority as it is the only technology not governed by the *Safety Standards Act*.

SUMMARY

To facilitate the educational component of the Accident Prevention Model, safety officers delivered educational programs to all railway operators in an effort to help them develop and enhance their Safety Management Systems.

As auditing is the primary tool of the railway program (and is an important pillar in the Accident Prevention Model), safety officers completed 68 small and four large comprehensive audits on railway operations through out the province. These audits review a railway's operation and maintenance activities against its Safety Management System. The information gathered from these audits forms the future direction of the program.

In addition to the auditing process, the railway program produced a working set of regulatory manuals designed for each of the four railway classes. These manuals were introduced as guidelines and provided to industry for consultation and comment. It is anticipated that once the process is completed, they will be submitted to the Province for approval in 2009.

As the foundation of the railway program continues to be built, the work that has been accomplished in 2008 will support rail safety throughout the province and, in particular, ensure those operations that are not currently regulated are captured and brought under the BC Safety Authority railway regulatory program.

E Samuelson

Eric Samuelson
Railway Safety Manager

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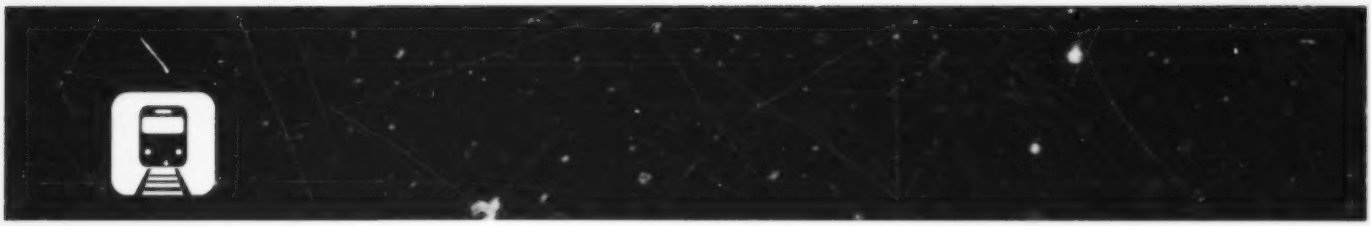


INSPECTION ACTIVITY IN 2008

Safety officers take a multifaceted approach to railway safety when assessing a railway's construction, operation and maintenance. The Railway Safety Program conducts audits and safety assessments to monitor a railway's operation and conformance to its approved Safety Management System.

Depending on the size and complexity of the railway's operations, a single audit can extend over several days. Consequently, the Railway Safety Program records its activities in terms of hours rather than the number of inspections, the method typically used in other sections of this report. In 2008, railway safety officers spent more than 3,000 hours conducting safety assessments of the four classes of railway operations.

In 2007, railway safety officers identified approximately 40 railway operations throughout the province operating without railway certificates. In 2008, 12 of these identified railway operations started developing their Safety Management Systems while others are applying for Minister's Certificates with the BC Ministry of Transportation and Infrastructure.

ACCIDENTS AND INCIDENTS IN 2008

Reporting accidents and incidents for commuter and industrial railways is done in accordance with federal regulations.[20] Unlike the reporting methods used by other technologies regulated by the BC Safety Authority, the federal requirements use the terms "accident" and "incident" to report events that cause injury, damage or create a risk of injury or damage

Accidents and incidents occurring on provincially regulated common carrier railways are reported to the Transportation Safety Board of Canada in accordance with an agreement with the provincial government and are not published. There were a total of 111 incidents reported on industrial, commuter and heritage railways. Incidents on common carrier railways are not included in these statistics.

Industrial railways reported 34 incidents, one of which remains under investigation. At the time of publication, this event is not a confirmed incident. The remaining 33 incidents were slow speed derailments caused by equipment or procedural problems; however, these incidents did not cause equipment damage and did not have any adverse environmental impact. The BC Safety Authority was notified of an accident where an employee sustained major injuries when a railcar door fell onto him. The subsequent investigation, which focused on occupational health and safety procedures, was led by WorkSafeBC and concluded that a manufacturing flaw not related to the railway's operations caused the incident.

Commuter railways are required to report any incident that occurs on railway property and causes a derailment, equipment damage, property damage or injury to employees or the public. There were 72 reported incidents in 2008. Safety officers determined that none of the incidents were caused by inadequate rail operational policies and procedures, passenger handling procedures or equipment failures. The majority of these incidents were slips, falls and trips on commuter rail property (including station parking lots, entrances and platforms) that caused minor injuries.

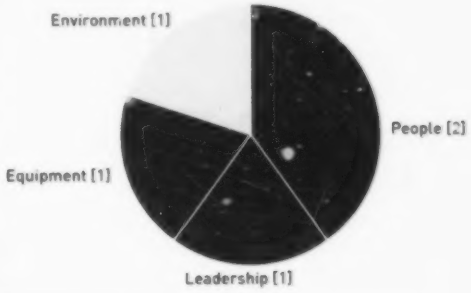
[20] Adopted from the *Canadian Transportation Accident Investigation and Safety Board Act*.

ACCIDENTS AND INCIDENTS IN 2008 [CONTINUED]

Heritage railways reported five incidents. All five incidents involved derailments; two instances were caused by human error and one incident was due to a mechanical failure. Environmental factors and lack of maintenance were the causes of the remaining incidents. In the case where environmental factors caused the incident, high ambient temperatures caused the steel rail to expand resulting in a track defect. There were no injuries reported in any of the incidents.

R.1 INDUSTRIAL RAILWAY INCIDENTS BY IDENTIFIED CAUSE
NUMBER OF CONFIRMED INCIDENTS: 33

R.2 HERITAGE RAILWAY INCIDENTS BY IDENTIFIED CAUSE
NUMBER OF CONFIRMED INCIDENTS: 5



IMPROVING PUBLIC SAFETY

In the fall of 2008, the Railway Safety Program continued its education programs. For the second year, safety officers held town hall meetings for 37 operators of all classes of railways in four cities throughout the province: Terrace, New Westminster, Prince George and Cranbrook. The meetings covered medical rules in the regulations and included a presentation on Safety Management Systems.

Considerable time was spent during both town hall meetings and railway assessments to educate clients on the need to report railway accidents and incidents. We informed clients that their failure to report these events severely hampers the Railway Safety Program's ability to carry out trend analysis in support of future accident prevention initiatives.

Increasing the education and skills of our staff is also important. In 2008, safety officers completed accident investigation and track inspection training to better assess railway operations. As well, the Railway Safety Program, in collaboration with regulators in Alberta, Saskatchewan and Manitoba, offered an educational opportunity to all provincial railway clients by sponsoring an accident investigation course in Calgary, Alberta.

In 2007 and early 2008, safety officers identified abandoned and unregulated commercial sidings and spurs. In 2008, the Railway Safety Program developed a strategy to research the risk associated with these operations to determine their impact on public safety, and we are planning to carry out a research pilot project in 2009.

FUTURE OUTLOOK AND TRENDS

In 2007, the Railway Safety Program developed a guide to railway legislation and regulation for industrial, common carrier and heritage railways. These guides, the "railway canons" were introduced to industry in 2008 and will be recommended to the Province for regulatory approval following industry consultation. Our goals are to complete the development of the new regulatory requirements, educate our clients on their statutory obligations and continue to work with industry to ensure the safe operations of certified railways.

In consultation with designers, builders and operators, the Railway Safety Program started a process to complete regulatory requirements for commuter railways. These requirements are based on requirements of other recognized national and international regulatory authorities, but will be flexible enough to accommodate advances in technology.

APPENDIX A

MUNICIPALITIES THAT ADMINISTER THE *ELECTRICAL SAFETY REGULATION*

The BC Safety Authority oversees electrical safety throughout British Columbia, with the exception of the following municipalities:

- City of Burnaby
- City of North Vancouver
- City of Surrey
- City of Vancouver
- City of Victoria
- Corporation of the District of Maple Ridge
- District of North Vancouver
- Municipality of West Vancouver

MUNICIPALITIES THAT ADMINISTER THE *GAS SAFETY REGULATION*

The BC Safety Authority oversees gas safety throughout British Columbia, with the exception of the following municipalities:

- City of Burnaby
- City of Kelowna
- City of North Vancouver
- City of Richmond
- City of Vancouver
- Corporation of the District of Maple Ridge
- District of North Vancouver

Note: Municipalities administer gas inspection programs for detached dwellings with gas services at a pressure of 14.0 kPa gauge or less as well as other buildings with gas services at a pressure of 15.0 kPa gauge or less and with a total connected load for the meter of 120 kW or less.

DEFINITIONS

CONSULTATION DEFINITIONS

Ad hoc Issue Group: A group of industry subject matter experts formed to address a specific issue, activity or project toward a specified outcome. The ad hoc issue groups report quarterly to the Technology Committee and may be dissolved when the outcome is delivered.

Technology Committee: Non-decision-making bodies made up of volunteer industry representatives that have a primary role of identifying and advising the BC Safety Authority on public safety issues pertinent to the BC Safety Authority's mandate.

DOCUMENTS AND PUBLICATIONS

Compliance Orders: Written documents issued by a safety officer or safety manager stating that a person must take action, stop or modify his or her work to comply with safety standards and legislation.

Directives: A document that clarifies interpretations of code or regulation requirements; provides direction concerning how a regulation will be applied; or serves as the instrument by which a safety manager exercises a power granted under the *Safety Standards Act*.

Discipline Orders: Written documents issued by a safety manager to a party performing regulated work who is not in compliance with safety standards and legislation; the order may include any sanction that the safety manager considers reasonable.

Equivalent Standards Agreement: An objective-based contract made between the BC Safety Authority and a regulated company. Under this Agreement, the emphasis for safety is placed on what needs to be achieved, not how it is to be achieved.

Information Bulletins: Non-statutory and non-binding instruments that provide general information to employees, stakeholders and the public.

Integrity Management System: A system that ensures the delivery of safety requirements in accordance with the *Safety Standards Act* while maintaining the client's operational value and minimizing risks associated with accidents and loss of production. The related activities ensure that the people, systems, processes and resources that deliver safety integrity are in place and in use.

Monetary Penalty: An administrative penalty levied by a safety manager in amounts up to a maximum of $100,000 to penalize non-compliant behaviour.

Safety Management System: A formal framework that systematically sets out a company's rules, procedures and responsibilities with regards to safety.

Safety Orders: Binding instruments issued by safety managers to prevent, avoid or reduce the risk of personal injury or damage to property.

INCIDENT DEFINITIONS

Confirmed Incident: An incident that has established causal involvement by regulated equipment.

Disqualified as an Incident: Reported cases that do not meet the minimum requirements of an incident (as defined by the BC Safety Authority).

Incident: An event that involves technology overseen by the BC Safety Authority and either:

(a) causes death, personal injury or damage to property, or

(b) creates a risk of personal injury or damage to property.

Incident Notification: A suspected incident that has been registered with the BC Safety Authority. Following investigation, we evaluate all reported cases against the definition of an incident and classify them as either an actual "incident" or "disqualified as an incident".

INCIDENT CAUSES

Environment: An incident primarily caused by or involving climate, weather or naturally occurring conditions. Examples include incidents caused by wind, lightning, earthquakes, hail, snow and mud or rock slides.

Equipment: An incident primarily caused by or involving regulated machinery or products. Equipment-related incidents are caused by either a product failure, design flaw or manufacturing flaw.

Leadership and Procedures: An incident primarily caused by or involving a failure to manage and adhere to established safety guidelines, processes and standards. This includes causes such as inadequate staff training, lack of staff, lack of maintenance, incorrect procedures, poor quality control and misuse of equipment.

People: An incident primarily caused by or involving human-related factors. These human factors include lack of attention, a rule violation, lack of knowledge and sabotage.

Undetermined: An incident where the primary cause cannot be assessed or confirmed. Undetermined incidents are normally the result of insufficient evidence remaining from a fire and as such it is not possible to either confirm or deny that regulated equipment caused the incident.

Unspecified: An incident where the cause was not identified when reported to the BC Safety Authority. These incidents are normally investigated by another organization and later reported to the BC Safety Authority.

DEFINITIONS

INJURY CLASSIFICATION

Major Injury: An injury that involves long-term impairment of function or loss of function of any body part, organ or mental faculty, significant physical pain and some disability or loss of function; this includes fractures, internal injuries or wounds that are serious but not life threatening and psychological trauma that results in some temporary or partial disability. Medical attention is required.

Minor Injury: A non-permanent injury that may require some medical treatment; this includes lacerations, contusions, abrasions or any other injuries that have no residual effect. Further professional medical attention is not required.

Near-Miss: An incident where no actual harm resulted, but the contributory causes are serious, and under different circumstances may have led to serious injury or death.

INSPECTION DEFINITIONS

Assessment: An evaluation or review that may include physical inspection or audit.

Certificate of Inspection: A report completed by a safety officer to document the inspection of regulated work and/or product.

Inspection: A physical examination of work and products to see if they meet safety requirements.

Non-Compliance: A failure to comply with a required code or safety regulation.

Risk Assessment Program: A computer program that uses risk-based principles to assign risk scores to regulated work and regulated equipment; the scores are utilized by safety officers to assist them in prioritizing inspection and audit activities to focus on higher-risk regulated work.

Risk-Based: A process using the product of probability and consequence to evaluate a number of factors to determine the potential hazard.

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